Avionics

WAAS and ADS-B are at hand, NDBs are near the end and EVS now has a place of its own. The digital revolution continues.

By Mal Gormley

Gordon Moore, co-founder of Intel, once famously observed that digital data density doubles every 18 months, with the result being less expensive, faster and more capable computers. An aviation variant of the so-called Moore's Law is trickling down to the cockpits of the newest light aircraft. As their size and costs decline, the capabilities of integrated circuits accelerate, creating more exciting possibilities for avionics, especially glass cockpit displays and safety technology.

Seeing the trend, the aviation training community is responding. Embry-Riddle Aeronautical University, for one, is adding glass cockpits with ADS-B avionics to its newest Cessna 172s. Similarly, the University of North Dakota is purchasing seven Piper PA-28s equipped with Avidyne's FlightMax Entegra integrated flight deck, along with Avidyne-supplied training stations, for use at its John D. Odegard School of Aerospace Sciences. Meanwhile, Avidyne reports that Piper is adding glass cockpit capabilities to several of its smaller general aviation models, and Canada's Symphony Aircraft will have the first two-seat single equipped with an integrated glass instrument panel. And earlier, Meggitt/S-TEC announced its S-TEC System 55 autopilots would be available as a factory-installed option in Symphony's new Avidyne Glass IFR configuration Symphony 160.

How does this impact business aviation? Graduates of these leading flight schools will be familiar with the integrated glass cockpit environments found in the newest business and commercial aircraft, thus facilitating their transition. Glass cockpits, no longer a gee-whiz option, are now becoming commonplace.

Symphony 160 cockpit with Avidyne Glass IFR

The move to upgrade to ADS-B capability at this time makes sense in light of the FAA's stated intention to initiate its ADS-B and SWIM (system-wide information management) projects in its 2007 fiscal year, which begins Oct. 1. ADS-B and SWIM are two of the core capabilities of the FAA's Next Generation Air Transportation System (NGATS). ADS-B will be an important NGATS element because it outperforms radar in accuracy, detection capability, update rate and coverage — all at a lower cost, say FAA representatives. The agency plans to install as many as 400 ADS-B ground stations across the United States and to decommission 200 or more radars.

Meanwhile, WAAS — the FAA's long-overdue wide area augmentation system developed to significantly increase location accuracy and reliability of precision approach GPS positioning systems — finally seems to be materializing. Universal Avionics recently completed its first WAAS flight test of its new "W" series flight management system by conducting approaches at the Farmington, N.M., airport, which has two WAAS instrument approaches, and at Tucson International Airport. Several hundred more WAAS approaches are expected

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to become available throughout the year. Incorporated into Universal's UNS-1Ew, 1Fw and 1Lw FMSes, the new SCN 1000 software takes advantage of the capabilities of WAAS for en route, terminal and instrument approach procedures.

In another example of trickle-down tech, Honeywell's Bendix/King EGPWS (enhanced ground proximity warning system) will be standard equipment on all Cirrus SR20 and SR22 models. Using technology derived from Honeywell's air transport EGPWS, the KGP 560 uses GPS positioning information and compares it to an internal database of terrain and obstacles to provide a moving map display of potential hazards, along with visual and audio alerts, should the aircraft approach too close. EGPWS is Honeywell's term for a terrain awareness and warning system (TAWS).

Other recent avionics developments worth noting include:

➤Avidyne is offering a new line of active surveillance traffic systems for helicopters. The TAS600 series include Heads Up Audible Position Alerting and other features beginning at $9,900. The company, which acquired Ryan International in 2005, utilizes active surveillance technology from Ryan's

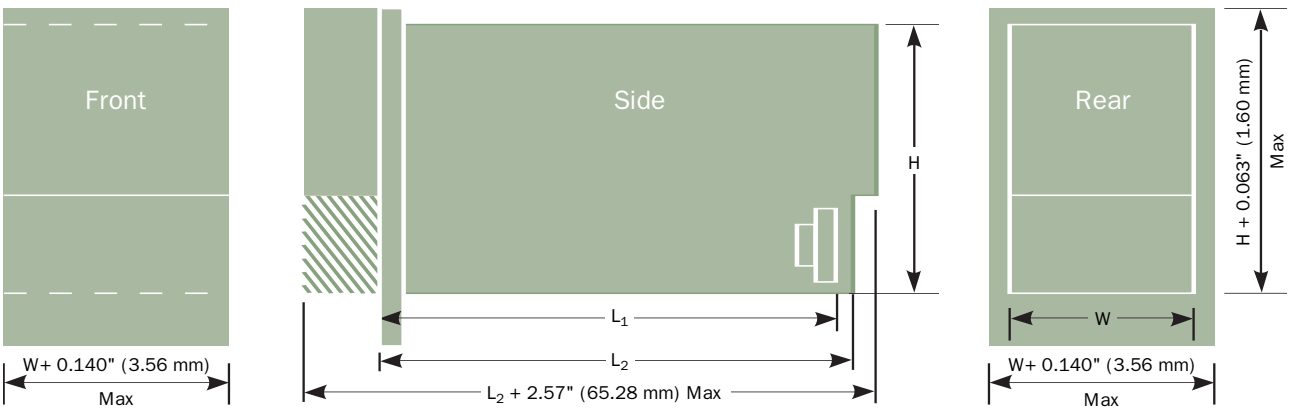
Cirrus SR20 and SR22 models will have Bendix/King EGPWS standard.

popular 9900BX system. The three new TAS600 series systems have a range of features that allow helicopter owners to select the price-performance level that best fits their aircraft and mission. The systems are certified for installation on most helicopters and are available as an option on new Eurocopter EC135, EC145 and EC155 models as well as the Agusta A119. The series, ranging in price up to $20,990, provides intruder squawk codes and N-numbers of Mode S-equipped aircraft and show standard TCAS symbology on display systems from 15 different manufacturers including Avidyne, Garmin, Honeywell, Collins, Chelton, Sandel and others.

➤CMC Electronics and Jeppesen have teamed up to integrate various components from each company to produce upgraded Class 2 electronic flight bags (EFB). Jeppesen will provide its software, data and applications, including digital terminal chart and content administration tools, along with its airport moving map, and its soon-to-be-released en route moving map. CMC, maker of the Class 2 PilotView EFB system, will supply its installation-related STCs and post-sale support services and will serve as the system integrator. CMC's EFB has been certified on the Global Express and Pilatus PC-12, and will soon be certified on the Falcon 10 and 50, the Gulfstream IV, and all Boeing 737 models, including the BBJ.

➤Meanwhile, the FAA has approved Jeppesen's terminal chart viewer, which was specifically designed for portable and semi-integrated Class 1 and 2 EFBs. Because of the FAA's OK, Jeppesen claims it is the first and only provider of digital aeronautical charts to have received operational approval for all three EFB classes. Jeppesen, along with its parent company, Boeing, already received operational approval for its Class 3

STANDARD ATR CASE DIMENSIONS



ATR Size	Approx. Volume		W		L_1		L_2 (Max)		H (Max)	
	In³	Liter	± 0.03 In	± 0.76 mm	± 0.04 In	± 1.0 mm	In	mm	In	mm
Dwarf	95	1.56	2.25	57.15	12.52	318.0	12.62	320.5	3.38	85.8
1/4 Short	215	3.52	2.25	57.15	12.52	318.0	12.62	320.5	7.62	193.5
1/4 Long	335	5.49	2.25	57.15	19.52	495.8	19.62	498.3	7.62	193.5
3/8 Short	340	5.57	3.56	90.41	12.52	318.0	12.62	320.5	7.62	193.5
3/8 Long	530	8.69	3.56	90.41	19.52	495.8	19.62	498.3	7.62	193.5
1/2 Short	470	7.70	4.88	123.95	12.52	318.0	12.62	320.5	7.62	193.5
1/2 Long	725	11.88	4.88	123.95	19.52	495.8	19.62	498.3	7.62	193.5
3/4 Short	720	11.80	7.50	190.50	12.52	318.0	12.62	320.5	7.62	193.5
3/4 Long	1,120	18.36	7.50	190.50	19.52	495.8	19.62	498.3	7.62	193.5
1 Short	975	15.98	10.12	257.05	12.52	318.0	12.62	320.5	7.62	193.5
1 Long	1,510	24.75	10.12	257.05	19.52	495.8	19.62	498.3	7.62	193.5
1 1/2	2,295	37.62	15.38	390.65	19.52	318.0	19.62	498.3	7.62	193.5

CMC Electronic Flight Bag

EFB chart viewing software, which offers the same basic functionality as these Class 1 and 2 systems. To qualify for the FAA approval, Jeppesen's terminal chart application needed to satisfy a number of criteria, including human factors considerations and its ability to functionally replace paper charts. Even though the Jeppesen applications are operationally approved, U.S. air carriers must still gain specific approval from their principal operations inspectors and complete a six-month evaluation using electronic charts.

➤When was the last time you shot an NDB approach? Although we still include Automatic Direction Finders in our listings because they still show up on many operators' MELs, they soon may become museum pieces. The FAA will cancel more than 200 NDB-based flight procedures on July 7 and another group of more than 200 on Sept. 7. This action follows a proposal in the U.S. *Federal Register* on March 3, 2005, to eliminate what have become redundant instrument approaches. That notice included a listing of 480 NDBs slated for possible cancellation. The National Flight Procedures Office considered more than 680 comments during the comment period. Since the agency is moving to satellite navigation, it wants to concentrate resources on the development, flight inspection and life-span maintenance of new WAAS-capable RNAV procedures. To meet the FAA's criteria for NDB cancellation, the target NDB and an RNAV procedure must serve the same runway end.

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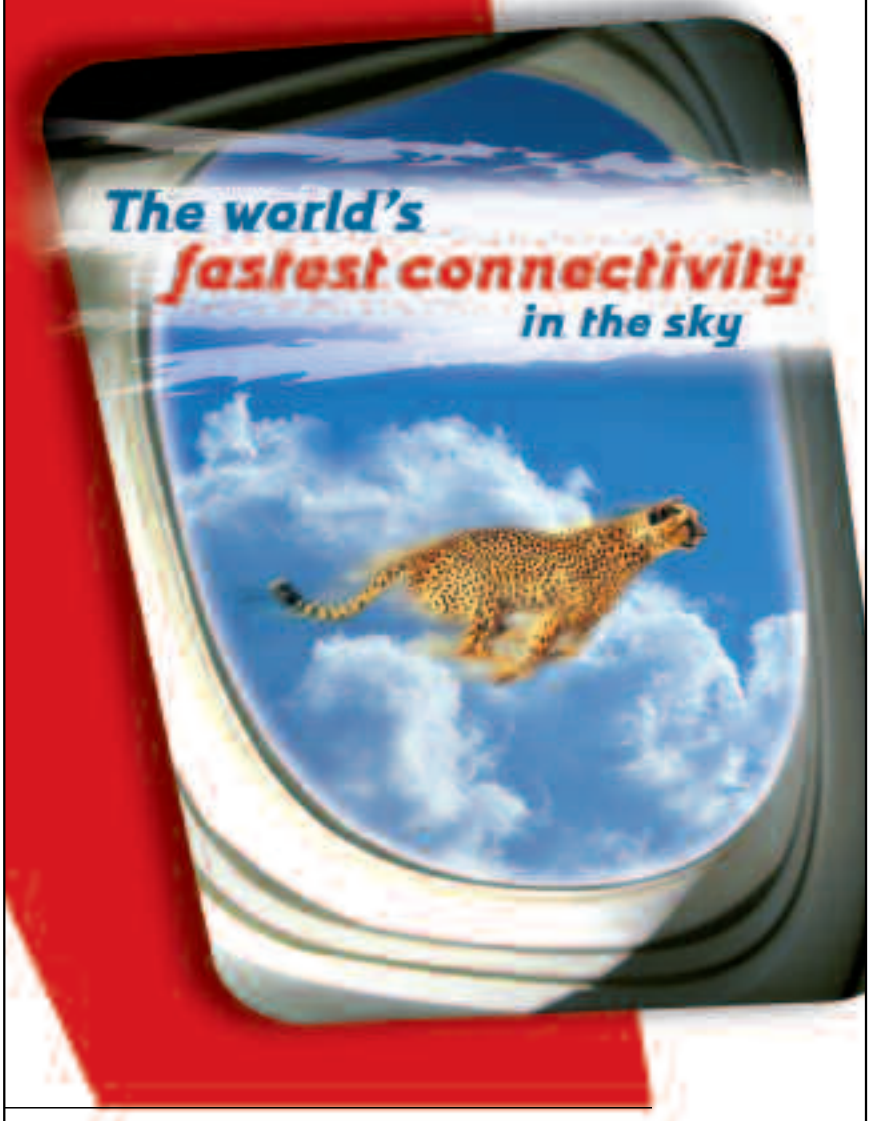

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CHANGING THE RULES IN AIRBORNE CONNECTIVITY

MIMSAR & SHIFRIN

➤In news from a technology you may have thought was already extinct: ARINC says that its high-frequency data link (HFDL) is becoming more popular both because of its high availability over much of the globe, and its relatively low cost. The company said there are more than 500 aircraft now using its GLOBALink/HF, including 125 that have signed up in the last nine months alone. Michelle Kyle, who manages ARINC's HF business, says, "Many carriers are using HFDL instead of satellite, or as a backup." Partly, it's because of HFDL's "seamless" coverage, especially at high polar latitudes where satcom coverage becomes unavailable, and also over remote regions where ground-based VHF stations don't exist. Airbus and Boeing have certified most of their models for HFDL, and airlines often order new aircraft with HFDL as standard, Kyle said. And because of the lower cost of HFDL avionics compared to satcom, it is considered cost effective and reliable for digital data link messages. This is particularly true for cargo carriers and passenger carriers that are not planning for passenger communications. ARINC launched its HFDL service in 1998. Because HF signals can travel more than halfway around the world, only 14 HFDL stations are needed to provide redundant coverage for North Atlantic routes and supplemental coverage elsewhere, the company says. But to improve the network's functionality even more, ARINC is installing new electronics and software at all 14 stations during 2006.

➤In related news, Airservices Australia has begun operating an enhanced HF radio system that replaces the nation's 30-year-old network. The new system should provide a clearer signal, with a greater range than the old network, and with less atmospheric interference, the service provider says. There are still a substantial number of aircraft operators in Australia's vast interior that rely solely on HF for communications. In addition, about 70 percent of aircraft inbound and outbound from Australia use HF radio. And a new HF air-ground radio system has been commissioned by the Irish Aviation Authority and Iceland CAA to upgrade their integrated North Atlantic service.

➤ARINC Direct is offering VHF digital Mode 2 data link service for Bombardier's new Challenger 300 and other aircraft equipped with Rockwell Collins Pro Line 21 data link equipment. The VDL service was deployed in May 2005 to coincide with the first Challenger 300 customer delivery. In Rockwell's integrated Pro Line 21 CNS (communications, navigation and surveillance) system, its digital VHF-4000 data radio is paired with its RIU-4000 radio interface unit or CMU-4000 communications management unit to provide VDL Mode 2 data link capability, which Rockwell expects will grow in popularity as more business jet users, as well as airlines, adopt the technology.

➤Rockwell Collins says it has received the first C166 TSO approval for ADS-B functionality on Mode-S transponders. The approval enables the use of ADS-B to provide enhanced traffic situational awareness on the airport surface and/or advanced flight procedures, including visual acquisition for see and avoid, sequencing and merging, crossing and passing maneuvers, and oceanic in-trail operations. According to Rockwell Collins, its TDR-94/94D (-108 versions) are the first transponders to be fully compliant with the RTCA DO-260A standard, which ensures the integrity and accuracy of data necessary to fully support

the future surveillance applications that are being proposed for operations en route, in terminal areas, in non-radar areas and on airport surfaces. Besides the FAA TSO, the TDR 94/94D transponders are approved by the European Aviation Safety Agency (EASA) and standards to support both elementary and enhanced surveillance, which means the transponder can reply to ground-based SSR (secondary surveillance radar) interrogations that give air traffic controllers enhanced surveillance information. The TDR-94/94D continues to support TCAS II functions as well, Rockwell says. Operators with existing Pro Line radio installations can update the TDR-94/94D transponders through appropriate service bulletins.

This year we've added, a new category, **Enhanced Vision Systems,** to the avionics listings. We invite you to take a look at what we believe will become another mainstream technology in coming years. Although enhanced and synthetic vision systems for civilian use have been in serious development for more than a decade, it's only in the past few years that their true capabilities and utility have materialized. And like everything else we depend upon for flying safely through the weather and dark of night, the cost will doubtless continue to come down, making the technology available for an ever wider segment of business aviation.

Indeed, Kollsman and Sandel recently announced they are jointly developing EVS and SVS for use on smaller business aviation aircraft such as the new very light jets. Initially, the joint effort will focus on integrating Sandel's advanced displays with Kollsman's ultra-compact HUD, called a MicroHUD. A follow-on program will add Kollsman's new heads-down FLIR capability, named GAViS, which would give the pilot improved visibility in darkness. In both cases, the goal is to reduce the size and cost of these advanced display technologies, making them affordable to a broader group of business and general aviation operators. Kollsman wants to get the price of its HUD down to half the industry-standard $100,000, and to do the same for the infrared imager. The company sees certification of the GAViS occurring by midyear and late this year for the new HUD. In addition, Kollsman is flight-testing a combined enhanced and synthetic vision system, called ESViS, which overlays the sensor image on terrain computer-generated from an onboard database, being developed by Jeppesen. ESViS also includes a Sandel TAWS. Its certification is expected in early 2008.

All of which means we'll keep watching this and other important avionics developments and report on them as they happen. **B&CA**

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Avionics Glossary

A

AC — Advisory circular

ACARS — Airline communications addressing and reporting system

ACAS — Aircraft collision avoidance system

ADC — Air data computer

ADI — Attitude direction indicator

ADS — Air data system

ADS-B — Automatic dependent surveillance-broadcast

AES — Aircraft earth station

AFCS — Automatic flight control system

AFIS — Automated flight information system (Honeywell)

AHRS — Attitude-heading reference system

Air Data — Values computed from pitot, static and temperature measurements, usually by means of a digital computer; ARINC 575 defines outputs

AMLCD — Active matrix liquid crystal display

AMSS — Aeronautical mobile satellite service

AOA — Angle of attack

AOG — Aircraft on ground

A/P — Autopilot

ARINC — Aeronautical Radio, Inc.; a nonprofit corporation owned by member airlines to define form, fit and function of avionics equipment and to provide radio communication services

ARINC 419 — Digital information transfer characteristics as applied in ARINC 500-series equipment specifications

ARINC 429 — A standard for broadcast digital information transfer systems for general applications

ARINC 561 — Inertial navigation system specifications

ARINC 571 — Inertial sensor attitude-heading reference system specifications

ARINC 575 — Digital air-data system specifications

ARINC 700-series — All-digital equipment specifications for new-generation transport category aircraft

ASCB — Avionics Standard Communication Bus (Honeywell)

A/T — Autothrottle

ATI — Air transport indicator; standard case sizes ranging nominally from 2 ATI to 6 ATI

ATM — Air traffic management

ATN — Aeronautical telecommunications network

ATR — Air transport radio; ARINC form-factor/standard case dimensions; 1 ATR = 8 MCU

AVOD — Audio/video on demand

B

BCD beam width — Included angle of weather radar interrogation signal

B-GAN — Broadband global area network

BITE — Built-in test equipment

B-NAV — Basic area navigation; concept of easing congestion in European airways by requiring aircraft to be fitted with equipment that will allow more direct routings by ATC

BRG — Bearing

C

CAT — Clear air turbulence; high-altitude turbulence encountered where no clouds are present

CAT I — An ILS approach providing operation down to a 200-foot decision height and an RVR of not less than 2,400 feet

CAT II — An ILS approach providing operation down to a 100-foot decision height and an RVR of not less than 1,200 feet

CAT IIIa — An ILS approach providing operation with no decision height to and along the surface of the runway with external visual reference during the final phase of landing and with an RVR of not less than 700 feet

CAT IIIb — An ILS approach providing operation with no decision height limit to and along the surface of the runway without reliance on external visual reference, and subsequently taxiing with an external RVR of not less than 150 feet

CAT IIIc — An ILS approach providing operation with no decision height limit to and along the surface of the runway and taxiways without reliance on external visual reference

CCD — Cursor control device

CDI — Course deviation indicator

CDMA — Code division multiple access

CDU — Control display unit

CFIT — Controlled flight into terrain

CMOS — Complementary metal oxide semiconductor

CMU — Communications management unit

CNS/ATM — Communication, navigation, surveillance/Air traffic management (supersedes "FANS" terminology)

COM — Communications

Contact Digitizer — A mechanical device that converts analog information to digital codes by means of electrical contacts

COTS — Commercial off the shelf (i.e., computer hardware, software or avionics)

CPDLC — Controller pilot data link communications

CRT — Cathode ray tube

CSDB — Commercial standard data bus

CVR — Cockpit voice recorder

D

DADC — Digital air data computer

DAMA — Demand-assisted multiple access (satcom broadband)

DAP — Datalink aircraft parameters

dB — Decibel; acoustic measurement unit

DBS — Direct broadcast satellite

DFDAU — Digital flight data acquisition unit

DGPS — Differential global positioning system; LA- prefix refers to Local-Area DGPS; WA- prefix refers to Wide-Area DGPS signal retransmission schemes

DH — Decision height

Digitizer — Electronic device capable of converting information to a digital format; usually refers to encoding devices that convert sensed altitude into a transponder code

DME — Distance measuring equipment

drms — Distance root mean squared

DRVSM — Domestic reduced vertical separation minimums

DTK — Desired track

DTU — Data transfer unit

Duplex — Separate channels for transmission and receiving

E

E- (as a prefix) — Used with "ADI" or "HSI" to designate an electronic display using a CRT

EAROM — Electrically alterable read-only memory; a type of digital memory device

ECDI — Electronic course deviation indicator

EEPROM — Electrically erasable programmable read-only memory

EFIS — Electronic flight instrumentation system

EGNOS — European geostationary navigation overlay service

EICAS — Engine-indicating and crew-alerting system

EIDS — Electronic information display system

EL — Electroluminescent display

Eurocae — European Organization for Civil Aviation Electronics; a regulatory agency for avionics certification

F

FADEC — Full-authority digital engine control

FBL — Fly-by-light

FBW — Fly-by-wire

FCS — Flight control system

FD — Flight director

FDAU — Flight data acquisition unit

FDE — Fault detection and exclusion (GPS)

FDR — Flight data recorder

FLIR — Forward-looking infrared

FMCS — Flight management computer system

FMS — Flight management system

FOG — Fiber-optic gyro

G

Gas Discharge — A type of luminescent digital display

GCR — Ground clutter rejection

GLONASS — Commonwealth of Independent States satellite navigation system

GLS — GPS landing system

GLU — GPS landing unit (provides precision GPS guidance to the runway in CAT III operations)

GNSS — Global navigation satellite system

GPADIRS — Global positioning, air data, inertial reference system

GPS — Global positioning satellite

GPWS — Ground proximity warning system

GS — Groundspeed

G/S — Glideslope

H

HF — High frequency

HFDL — High-frequency data link

HGA — High gain antenna

HIRF — High-intensity radiated field; sometimes seen as HERF (high-energy radio frequency or high-energy radiated fields)

HITS — Highway-in-the-sky

HPA — High-power amplifier

HSD — High-speed data

HSI — Horizontal situation indicator

HUD — Head-up display

Hz or Hertz — Cycles per second; used to describe radio frequencies; usually with the prefix k for kilo (1,000), M for mega (one million) or G for giga (one billion)

I

IAC — Integrated avionics computer; the central processor of a Honeywell integrated cockpit system

IAPS — Integrated avionics processing system; the central processor of a Rockwell Collins integrated cockpit system

ILS — Instrument landing system

Inmarsat — International Mobile Satellite Organization

INS/IRS — Inertial navigation system/inertial reference system

ITU — International Telephone Union, refers to certain HF channels

IVSI — Instantaneous vertical speed indicator

J

JAR — Joint Airworthiness Requirement; issued by the European Joint Airworthiness Authority (JAA)

L

LAAS — GNSS local area augmentation system

Laser IRS — Inertial reference system deriving angular rate information by measuring Doppler shift between two contra-rotating light beams

L-band — A radio frequency between 390 and 1550 MHz

LCD — Liquid crystal display

LED — Light-emitting diode

LEO — Low Earth Orbit (satcom)

LNAV — Lateral navigation guidance

LOC — Localizer; the course guidance component of an ILS

Looks per minute — Scanning or sweep rate of a weather radar antenna

Loran-C — Hyperbolic grid navigation system based upon measured time differences (TD) from pulse transmissions

LPV — Localizer performance approach (WAAS)

LRU — Line replaceable unit

M

MCDU — Multifunctional control display unit; part of FMS

MDAU — Maintenance data acquisition unit

MDU — multifunction display unit

MFD — Multifunction display; the third or fifth tube in an EFIS, it replaces the weather radar screen and displays radar data, navigation maps, checklists and other information

MNPS — Minimum Navigational Performance Specifications

MOPS — Minimum Operational Performance Standard (RTCA)

MTBF — Mean time between failures

N

NA — Not available

NANU — GPS notice advisory to Navstar users

NAT — North Atlantic Tracks

NMS — Navigation management system

NMU — Navigation management unit

NPA — Non-precision approach

NVM — Nonvolatile memory; digital memory that retains information through system shutdown

O

OEM — Original equipment manufacturer

OM — Outer marker (glideslope)

Optical Digitizer — Any device using a photo sensor that can convert analog information to digital code

P

PCU — Passenger control unit (cabin system)

PDU — primary display unit

Peak Power Output — The maximum transmitter power output measured over a short time; usually used to rate pulse transmissions

PEP — Peak envelope power; a standard electronic rating of any AC source, including a radio transmitter

PFD — Primary flight display

Pulse — A transmission of very brief duration used to carry information by using time measurement or as a series of pulses representing code

PVT — Position, velocity, time (WAAS)

Q

QFE — Field elevation pressure

QNH — Sea level pressure

R

RA — (1) Radio altitude; (2) Resolution advisory (TCAS)

RAIM — Receiver autonomous integrity monitoring (GPS)

RAM — Random access memory

RCU — Radio control unit

REACT — Rain echo attenuation compensation technique (Honeywell weather radar feature)

RF — Radio frequency

RFU — Radio frequency unit (satcom component)

RMI — Radio magnetic indicator

RMU — Radio management unit

RNAV — Area navigation

RNP — Required navigation performance

RS-232, RS-422 — Serial digital formats used for data transmission

R-T — Receiver-transmitter combined in a single line-replaceable unit

RTCA, Inc. — An association of U.S. governmental and industry aeronautical organizations dedicated to advancing aeronautics through consensus and recommendations

RVSM — Reduced Vertical Separation Minimums

S

SAMPE — Society for the Advancement of Material and Process Equipment

SAR — Search and rescue

Satcom — Satellite communications system

SDU — Satellite data unit (satcom)

SELCAL — Selective calling system (used primarily with HF)

Simplex — Single frequency for both transmitting and receiving in communications; generally implies a push-to-talk function and verbal procedures

SITA — Societé Internationale de Telecommunications Aeronautique; an international organization providing global telecommunications and information services to the air transport industry

Squitter — The transmission of a specified reply format at a minimum rate without the need to be interrogated (transponders)

SSB — Single sideband; a highly efficient form of radio transmission wherein information is carried on a sideband instead of the center carrier in order to gain range performance; usually used in HF communication transceivers

SSCVR — Solid-state cockpit voice recorder

STC — Supplemental type certificate

Synchro — Any device capable of converting mechanical position into an analog electronic signal

Synthesizer — Frequency synthesizer; an electronic circuit capable of generating multiple frequencies from a single crystal oscillator

T

TA — Traffic advisory (TCAS)

TAS — True airspeed

TAT — Total air temperature

TAWS — Terrain awareness and warning system

TCAS — Traffic alert and collision avoidance system

TIS — Traffic information system

TKE — Track error

TMC — Thrust management computer

TO/GA — Take off/Go around; operating mode

TRK — Track over the ground

TSO — Technical Standard Order; a performance specification and production compliance criteria applied to avionics and defined by FARs and RTCA, Inc.

TTG — Time to go

TTS — Time to station

TTR — TCAS II receiver/transmitter

TTW — Time to waypoint

Turbulence Mode — Flight control system mode in which a "softer" response to gust upsets is programmed

U

UHF — Ultra high frequency (300 to 3000 MHz)

UTC — Universal coordinated time

V

VAC — Volts alternating current

VDC — Volts direct current

VDL — VHF data link

VHF — Very high frequency

VNAV — Vertical navigation, or the capability to compute pitch-axis maneuvers and altitude-related points in space

VOR — Very-high-frequency omni range

VSI/TCAS — Vertical speed indicator/traffic alert and collision avoidance system

VSI/TRA — Vertical speed indicator/traffic, resolution advisory

W

WAAS — GNSS wide area augmentation system

WPS — Words per second; the rate at which a flight data recorder chronicles events

WPT — Waypoint

X

X-band — Frequency range in which most general aviation weather radars operate

XTK — Cross track; cross-track error

Z

Zulu — Greenwich or Universal Coordinated Time

VHF PANEL-MOUNT TRANSCEIVERS

Manufacturer	Model TSO	Channels Channel Display	Power Output (peak W) Power Required	Units/Weight (lb) Size (in.)	Price	Remarks
Garmin International 1200 E. 151st St. Olathe, Kan. 66062 (800) 800-1020 (913) 397-8200 Fax: (913)397-8282 www.garmin.com	SL40 C37d transmit C38d receive C128d stuck mic	760 LED	10 10 - 40 VDC	1/2.0 6.25 x 1.3 x 10.5	$1,495	Built-in two-place VOX intercom and standby frequency monitoring functions. Auto-leveling; auto-squelch; stuck-mic protection; remote-mic keying and channel call-up.
Honeywell Aerospace 1944 East Sky Harbor Circle Phoenix, Ariz. 85034 (800) 601-3099 Fax: (602) 365-3343 www.honeywellaes.com	Bendix/King KY 97A C37c C38c	760 LCD; nvm	7 nominal 14 VDC	1/2.9 6.25 x 1.3 x 10.5	$1,410	Same as KY 196A but 14 VDC power input.
	Bendix/King KY 96A C37c C38c	760 LCD; nvm	7 nominal 28 VDC	1/2.9 6.25 x 1.3 x 10.5	$1,490	Auto-squelch; displays active and standby frequency; remote flip-flop; optional remote call-up; optional extended frequency range.
	Bendix/King KY 197A C37c C38c	760 gas discharge; nvm	11 nominal 14 VDC	1/3.2 6.3 x 1.35 x 10.8	$3,950	Same as KY 196A but 2280 channels and 8.33 kHz channel spacing.
	Bendix/King KY 196B C37c C38c	2280 gas discharge nvm	18 nominal 28 VDC	1/3.2 6.3 x 1.35 x 10.8	$5,330	Includes ACARS, display and VDL-mode 2 internal radio.

VHF REMOTE-MOUNT TRANSCEIVERS

Manufacturer	Model Frequency TSO	Frequency Display Storage	Size or Xmit Power (W)	Units/Weight (lb) Power Form Factor	Price Required	Remarks
Honeywell Aerospace 1944 East Sky Harbor Circle Phoenix, Ariz. 85034 (800) 601-3099 Fax: (602) 365-3343 www.honeywellaes.com	Bendix/King KTR 908 C37b C38b	gas discharge 2 (9 channels); 118.0 - 151.975 MHz opt.	20	2/4.3 1.8 x 5.0 x 11.8	$15,490 28 VDC	Includes KFS 598A control with digital display of active/standby frequencies, flip-flop 118.0-151.975 MHz.
	RCZ 833 C37c/C38c C112 Class 3A	color CRT or LCD 2 to 12 depending on function	20	1/11.0 14.0 x 3.4 x 8.9	$14,015 ($47,702) 28 VDC	Price shown is the com portion in the Primus II integrated radio system. Price shown in () includes a diversity transponder; complete built-in diagnostics including the RF. Includes 8.33 kHz channel spacing and elementary spacing.
Rockwell Collins 400 Collins Rd. N.E. Cedar Rapids, Iowa 52498 (319) 295-4085 Fax: (319) 295-2297 www.rockwellcollins.com	VHF-22A C37c C38c	CTL-22 gas discharge 2 x 5 serial digital tuning 8 frequencies; nvm	20	2/5.8 3/8 ATR-SL	$17,878 28 VDC	Built-in diagnostics; VHF 22B, 118.0-151.975 MHz: $19,528. Operates in 25 kHz tuning movements; includes CTL-22.

VHF REMOTE-MOUNT TRANSCEIVERS

Manufacturer	Model TSO	Frequency Display Frequency Storage	Xmit Power (W)	Units/Weight (lb) Size or Form Factor	Price Power Required	Remarks
Rockwell Collins 400 Collins Rd. N.E. Cedar Rapids, Iowa 52498 (319) 295-4085 Fax: (319) 295-2297 www.rockwellcollins.com	VHF-422A C37c C38c	CTL-22 gas discharge 8 frequencies; nvm	20	2/5.8 3/8 ATR-SL	$17,870 28 VDC	Built-in diagnostics.
	VHF-22C C37c C38c	CTL-22C gas discharge; 2 x 5 serial tuning 8 frequencies; nvm	20	2/5.8 3/8 ATR-SL	$20,465 28 VDC	Built-in diagnostics; VHF-22D 118.0-151.975 MHz, $24,036. VFH-22D. 8.33 kHz/25 kHz tuning; includes CTL-22C.
	VHF-422C C37c C38c	CTL-22C gas discharge 8 frequencies; nvm	20	2/5.8 3/8 ATR-SL	$22,190 28 VDC	Built-in diagnostics; compatible only with CSDB or ARINC 429 controls; VHF-422D, 118.0-151.975 MHz, $21,756. 8.33/25 kHz tuning; includes CTL-22C.
	VHF-4000 C37d C38d	CTL-22 gas discharge 8 frequencies; nvm	20	2/4.7 2.5 MCU	see remarks 28VDC	Built-in diagnostics; compatible only with CSDB or ARINC 429 controls. Options: 001 baseline: includes CTL-22. 101 adds 8.33: includes CTL-22C. 201 adds Mode A/2 data; includes CTL-22. 301 adds 8.33 and Mode A/2 data: includes CTL-22C. Prices range from $13,976 to $21,892.
	VHF-4000E C37d C38d	CTL-22C gas discharge 8 frequencies; nvm	20	2/4.7 2.5 MCU	$21,892 - $26,264 28 VDC	Built-in diagnostics; compatible only with CSDB or ARINC 429 controls. Options: 101 118.0-151.975 + 8.33 includes CTL-22C. 301 adds Mode A/2 data inlcudes CTL-22C.
Wulfsberg Electronics 6400 Wilkinson Dr. Prescott, Ariz. 86301 (928) 708-1550 (928) 541-7627 www.wulfsberg.com	CVC-152 Control display	color LCD	N/A	1/0.75 2.50 x 3.15 x 4.29	$4,347 5 VDC, 5 VAC or 28 VDC	Gray or black panel.
	CCN-955	See remarks	N/A	1/0.75 2.50 x 3.15 x 4.29	$7,643 5 VDC, 5 VAC, 28 VDC	Optional multi-function display; color LCD displays nav and com data.
	CVC-151 FliteLine C169	118 - 136 MHz 118 -11.975 MHz color LCD	20	1/3.3 4.10 x 2.40 x 13.33	$14,040 18 - 33 VDC	ARINC 429 bus interfact; 8.33 or 25 kHz spacing; FM immunity; auto-tune capability. FMS and radio management interface capability VDL Mode 2 & 3 provisions; color LCD nav and com data.

HF TRANSCEIVERS

Manufacturer	Model TSO	Frequency Range Channels	Xmit Power (W)	Units/Weight (lb) Size or Form Factor	Price Power Required	Remarks
Honeywell Aerospace 1944 East Sky Harbor Circle Phoenix, Ariz. 85034 (800) 601-3099 Fax: (602) 365-3343 www.honeywellaes.com	HF-1050 C31d C32d	2-29.999 280,000	200 PEP (SSB)	4/29.9 RCU: 10.8 x 3.1 x 5.0 KPA 1052: 12.7 x 7.2 x 1.8 antenna coupler: 13.5 x 4.7 x 7.2 PS-440: 5.375 x 2.375 x 2.265	$47,870 28 VDC	Delivers 200W PEP transmitter power and 4 squelch options. "Once tuned, always tuned" coupler capability provides <20 millisecond response. PS-440 controller provides 99 user-programmable channels, clarifier functional and coupler tune status.
Rockwell Collins 400 Collins Rd. N.E. Cedar Rapids, Iowa 52498 (319) 295-4085 Fax: (319) 295-2297 www.rockwellcollins.com	F 9000 System C31d C32d	2 - 29.9999 SSB/AM AM data 280,000; 99 operator programmable; 176 ITU r/t programmed	selectable power output 10.50, 175 PEP	3/27.5 controller: 2.625 x 5.75 x 5.85 transceiver: 7.625 x 5.55 x 12.60 antenna coupler: 7.6 x 3.8 x 13.0	$102,292* 28 VDC	Fiberoptic interface; rapid-tune antenna coupler (40 milli-second computer training); BITE.Includes HF receiver/transmitter antenna coupler and radio-tuning unit. *Special order price and delivery

HORIZONTAL SITUATION INDICATORS/COMPASS SYSTEMS

Manufacturer	Model TSO	Gyro Slave rate	Autopilot Outputs	Units/Weight (lb) Display case	Price Power Required	Remarks
Honeywell Aerospace 1944 East Sky Harbor Circle Phoenix, Ariz. 85034 (800) 601-3099 Fax: (602) 365-3343 www.honeywellaes.com	Bendix/King KCS 305 C6c	remote 3°/min.; 600°/min.	analog	4/10.4 4 ATI	$11,610 115 VAC, 400 Hz	Includes bootstrap heading in HSI; autopilot outputs. Night-vision compatible instruments available.
	Bendix/King KCS 55A C6c	remote 3°/min.; 180°/min.	analog	4/9.4 3 ATI	$11,960* 14 or 28 VDC	Night-vision compatible instruments available. Includes RMI output. *$18,790 with KI 825 EHSI.
	KI 825 Color EHSI/MFD C113 C6d, C34e C36e, C40C C11a	remote —	extensive outputs; GPS selected discretes, EHSI-ready discretes	1/30 3 ATI	$12,720 11 - 33 VDC	Integrated EHSI, AMLCD; arc mode; 360 mode; course map; interfaces with numerous navigation systems and WX500 Stormscope. Priced for a new installation and a KCM 100.
Rockwell Collins 400 Collins Rd. N.E. Cedar Rapids, Iowa 52498 (319) 295-4085 Fax: (319) 295-2297 www.rockwellcollins.com	MCS-65 (compass system) C6c	remote 2.7°/min.; 7°/sec.	analog including autopilot outputs; CSDB	3/6.7 ATI	$15,608 28 VDC	Digital interface with EFIS-74 CSDB.
Sandel Avionics 2401 Dogwood Way Vista, Calif. 92081 (877) 726-3357 (760) 727-4900 Fax: (760) 727-4899 www.sandel.com	SN3500 EHSI C113	remote NA	analog	1/2.9 3 ATI	$10,950* 28 VDC	*3 x 3 electronic HSI combines HSI, RMI, color moving map and other features. Accepts synchro-stepper motor and ARINC 429 gyro inputs. Designed to work with a variety of digital and analog NAV, GPS, DME, ADF and marker beacon receivers. Compatible with the WX-500 Stormscope and weather radar. Optional interfaces for traffic ($714) and WSI data link weather ($714). *Helicptper version, $13,286.

HORIZONTAL SITUATION INDICATORS/COMPASS SYSTEMS

Manufacturer	Model TSO	Gyro Slave rate	Autopilot Outputs	Units/Weight (lb) Display case	Price Power Required	Remarks
Sandel Avionics 2401 Dogwood Way Vista, Calif. 92081 (877) 726-3357 (760) 727-4900 Fax: (760) 727-4899 www.sandel.com	SN4500 EHSI C113	remote NA	analog	1/3.75 4 ATI	$18,500 28 VDC	4 x 4 electronic HSI combines HSI, RMI, color moving map and other features. Accepts synchro- stepper motor and ARINC 429 gyro inputs. Designed towork with a variety of digital and analog NAV, GPS, DME, ADF and marker beacon receivers. Compatible with the WX-500 Stormscope and weather radar. Optional interfaces for traffic ($714) and WSI data link weather ($714).

AUTOMATIC DIRECTION FINDERS

Manufacturer	Model TSO	Frequencies Freq. Storage Display	Nav Outputs	Units/Weight (lb) Size or Form Factor	Price Power Required	Remarks
Honeywell Aerospace 1944 East Sky Harbor Circle Phoenix, Ariz. 85034 (800) 601-3099 Fax: (602) 365-3343 www.honeywellaes.com	Bendix/King KR 87 C41c	200-1799 kHz nvm gas discharge	analog	1/6.7 P/M 6.25 x 1.3 x 11.23	$3,390 11 - 33 VDC	Times flight and approaches; slaved indicator and RMIs available as options.
	RNZ-850 C34d C35d C36d C40b C41d C66b	100-1799.5 kHz; 2181-2183 kHz 1 freq; nvm CRT or LCD	RS-422 synchro XYZ DC sin/cos	2/13.6 14.0 x 3.4 x 8.9	$8,033 ($38,473) 28 VDC	Price shown is the ADF portion in the Primus II integrated radio system. Price in () includes VOR/ILS and DME; complete built-in diagnostics including the RF; remote mount.
	Bendix/King KDF 806 C41c	190-1799 kHz nvm gas discharge	analog	2/7.4 5.0 x 2.0 x 10.0	$18,550 28 VDC	Digital control head displays both active/standby frequencies; flag circuitry; strappable for 2182 kHz, Gables control optional. Remote flip-flop optional; nine frequency pilot-programmable. "A" control head optional. Night-vision-goggle-compatible control head available.
Rockwell Collins 400 Collins Rd. N.E. Cedar Rapids, Iowa 52498 (319) 295-4085 Fax: (319) 295-2297 www.rockwellcollins.com	ADF-60A C41c	CTL-62 190-1750 kHz (4-kHz steps) 6 frequencies; nvm gas discharge, 2 frequencies	RMI	2/6.0 3/8 ATR-SL	$18,472* 28 VDC	Remote-mount; dual antenna optional. Digital tuning. Includes ANT-60A, CAD-62. Dual system, $35,916.
	ADF-462 C41d	CTL62 190-1799 kHz and 2182 kHz emergency freq. 6 frequencies; nvm gas discharge	RMI	3/8.0 3/8 ATR-SL	$17,860* 28 VDC	Built-in diagnostics; compatible only with CSDB or ARINC 429 controls; digital signal processing; dual antenna optional. Includes ANT-462A. *Dual system, $35,892 includes two receivers, two controls, one antenna.
	ADF-4000 C41d	190-1799 kHz 2182 kHz emergency freq. 6 frequencies/nvm gas discharge	CSDB ARINC 429	3/6.4 2 MCU	$23,272 28 VDC	Built-in diagonostics; compatible only with CSDB or ARINC 429 controls; digital signal processing; dual antenna optional. Includes ANT-462A.

AUTOMATIC DIRECTION FINDERS

Manufacturer	Model TSO	Frequencies Freq. Storage Display	Nav Outputs	Units/Weight (lb) Size or Form Factor	Price Power Required	Remarks
Wulfsberg Electronics 6400 Wilkinson Dr. Prescott, Ariz. 86301 (928) 708-1550 (928) 541-7627 www.wulfsberg.com	DFS-431 C41c	190 - 1890 kHz, 2181 - 2183 kHz LCD	ARINC 429 analog	1/5.4 6.7 x 2.85 x 13.8	$13,678 18 - 33 VDC	ARINC 429 and AFCS bus interfaces; steering guidance to/from NDB; self-diagnostics and auto-calibration. CDF-552 color LCD, $4,220; AT-434A loop sense antenna, $5,200.

PANEL-MOUNT NAV RECEIVERS

Manufacturer	Model TSO	Channel Display Channel Storage	Nav Outputs GS/MB	Units/Weight (lb) Size or Form Factor	Price Power Required	Remarks
Honeywell Aerospace 1944 East Sky Harbor Circle Phoenix, Ariz. 85034 (800) 601-3099 Fax: (602) 365-3343 www.honeywellaes.com	Bendix/King KN 53 C34c C36c C40a	gas discharge 2 nav; nvm	CDI GS only	1/3.0 6.31 x 1.3 x 9.75	$4,470 Silver Crown Plus $4,340 Silver Crown 11 - 33 VDC	Displays both active and preset frequency.
	KLN 94 Color GPS Receiver C-129A	color penetration phosphor installed database	GPS none	1/3.6 2.0 x 6.31 x 10.72	$5,270 11 - 33 VDC	Direct replacement for KLN 89B. Database includes airports, VORs, NDBs, intersections and special use airspace.*Quick-tune feature automatically loads frequencies into a KX 155A nav/comm. Features roll steering.
	KLN 90B GPS Receiver C129 Class A-1	monochrome penetration phosphor installed database*	RS232 ARINC 429 none	1/6.2 2.0 x 6.31 13.15	$8.880 11 - 33 VDC	BRNAV compliant and approved for IRF en route, terminal and non-precision approach use. Features a 3-in. split screen CRT; built-in moving map graphics show nearby airports and navaids. Nav outputs provide data for external moving maps. Complete Americas or international database.
Rockwell Collins 400 Collins Rd. N.E. Cedar Rapids, Iowa 52498 (319) 295-4085 Fax: (319) 295-2297 www.rockwellcollins.com	VIR-4000 C34e C36e C40c C35d	CTL-32 gas discharge 6 frequencies; nvm	CSDB ARINC 429 NA	2/3.9 2.5 MCU	See remarks 28 VDC	Special order item and pricing. Combines ADF and VOR/ILS/MKR receivers in a single package. Internal diagnostics capability.
	NAV-4500 C34e C36e C40c C35d	CTL-32 gas discharge 6 frequencies; nvm	CSDB ARINC 429 NA	2/4.1 2.5 MCU	$24,812 28 VDC	Built-in diagnostics; compatible only with CSDB or ARINC 429 controls; digital signal processing; includes CTL-32 ($4,624); meets Eurocontrol FM immunity standards only. RTU 4200, $23,184
	NAV-4000 C34e C36e C40c C35d C41d	CTL-32 gas discharge 6 frequencies; nvm	CSDB ARINC429 NA	2/4.7 2.5 MCU	$31,584* 28 VDC	Built-in ADF; built-in diagnostics; compatible only with CSDB or ARINC 429 controls; digital signal processing; meets Eurocontrol FM immunity standards. *Various configurations will determine actual cost.

REMOTE-MOUNT NAV RECEIVERS

Manufacturer	Model	Channel Display / Channel	Nav Outputs	Units/Weight (lb) / Size or Form Factor	Price / Power Required	Remarks
Honeywell Aerospace 1944 East Sky Harbor Circle Phoenix, Ariz. 85034 (800) 601-3099 Fax: (602) 365-3343 www.honeywellaes.com	RNZ-850 C34d C35d C36d C40b C41d C66b	color CRT 1 to 12 depending on function; nvm	OBI; OBS synchro XYZ RS-22	2/13.6 14 x 3.4 x 8.9	$19,724 ($38,473) 28 VDC	Price shown is the VOR/ILS portion in the Primus II integrated radio system. Price shown in () includes a DME and ADF; complete built-in diagnostics including RF; Synchro XYZ mod filter included in unit.
	Bendix/King KNR 634A C40a C36c C34c C35d	gas discharge 2 nav; nvm	ARINC 429 CDI, HSI, RMI	2/6.5 3.0 x 5.0 x 10.0	$26,410 28 VDC	Synchro-interface KNI 582 RMI optional. Digital display of active/standby frequencies.
Rockwell Collins 400 Collins Rd. N.E. Cedar Rapids, Iowa 52498 (319) 295-4085 Fax: (319) 295-2297 www.rockwellcollins.com	VIR 32 C34c C35d C36d C40b	CTL-32 gas discharge 6 frequencies; nvm	SIN/COS, serial digital; RMI compatible	2/5.7 3/8 ATR-SL	$26,888 28 VDC, 26 VAC, 400 Hz	Replaces VIR-30A directly; includes serial digital control; digital signal processing; built-in diagnostics; rotor modulation filter optional (strap). Includes CTL-32. Meets FM immunity requirements.
	VIR 432 C34d C35d C36d	CTL-32 gas discharge 6 frequencies; nvm	serial digital	2/5.7 3/8 ATR-SL	$30,888 28 VDC, 26 VAC, 400 Hz	Built-in diagnostics; compatible only with CSDB or ARINC 429 controls; includes CSDB control, digital signal processing. Includes CTL-32. Meets Eurocontrol FM immunity requirements.
Wulfsberg Electronics 6400 Wilkinson Dr. Prescott, Ariz. 86301 (928) 708-1550 (928) 541-7627 www.wulfsberg.com	CVN-251 C40c C36e C34c C35d	108.0 - 117.95 MHz LCD	ARINC 429 SIN/COS	1/3.31 4.0 x 2.4 x 13.33 1/0.75 2.5 x 3.15 x 4.29	$20,631 18 - 33 VDC	ARINC 429 bus interface; 160 VOR channels; 40 LOC channels; includes glideslope/marker beacon receivers. FM immunity standard.
	CVC-152 Control Display	108.0 - 117.95 MHz LCD	ARINC 429 SIN/COS	1/3.31 4.0 x 2.4 x 13.33 1/0.75 2.5 x 3.15 x 4.29	$4,347 5 VDC, 5 VAC or 28 VDC	Combines COM and NAV tuning; gray or black panel.
	CCN-955	108.0 - 117.95 MHz LCD	ARINC 429 SIN/COS	1/3.31 4.0 x 2.4 x 13.33 1/0.75 2.5 x 3.15 x 4.29	$7,643 5 VDC, 5 VAC or 28 VDC	Combines COM and NAV tuning.

DISTANCE MEASURING EQUIPMENT

Manufacturer	Model / TSO	Channel Display	Nav Outputs / Power Outputs (peak W)	Units/Weight (lb) / Size or Form Factor	Price / Power Required	Remarks
Honeywell Aerospace 1944 East Sky Harbor Circle Phoenix, Ariz. 85034 (800) 601-3099 Fax: (602) 365-3343 www.honeywellaes.com	Bendix/King KN 64 C66a	gas discharge	serial data 100	1/2.6 6.3 x 1.3 x 12.3	$4,690 *Silver Crown Plus* $4,890 *Silver Crown* 11 - 33 VDC	Includes antenna and installation kit; accepts remote channeling. Distance accuracy: +0.1 nm nominal to 99 nm; +1.0 nm, 100 to 389 nm.
	Bendix/King KN 62A	gas discharge	serial data 100	1/2.6 P/M 6.3 x 1.3 x 12.3	$5,960 11 - 33 VDC	Includes antenna and installation kit; accepts remote channeling. Distance accuracy: ±0.1 nm nominal to 99 nm, ±1.0 nm, 100 to 389 nm.
	Bendix/King KN 63 C66a	gas discharge	serial data 100	2/3.6 6.5 x 1.1 x 11.55	$9,180 11 - 33 VDC	Includes KDI 572 indicator, optional slaved indicator. Distance accuracy: ±0.1 nm nominal to 99 nm, ±1.0 nm, 100 to 389 nm.
	RNZ-850 C34d, C35d C36d, C40b C41d,C66b	LCD	ARINC 568 RS-422 40mV/nm 300	2/13.6 NA	$10,814 $38,473* 28 VDC	Price is the DME portion in the Primus II Integrated Radio System. *Includes VOR/ILS; ADF; 4-channel scanning DME; complete built-in diagnostics including the RF; remote mount.
	Bendix/King KDM 706A C66b	gas discharge, slaved indicators	ARINC 429 ARINC 568 250	2/6.3 R/M 3.0 x 5.25 x 12.8	$18,430 28 VDC	Includes KDI 572 indicator; optional slaved indicator; kits/mounts not included.
Rockwell Collins 400 Collins Rd. N.E. Cedar Rapids, Iowa 52498 (319) 295-4085 Fax: (319) 295-2297 www.rockwellcollins.com	DME-42 C66b	gas discharge, serial digital 2 x 5 tuning	ARINC 568 serial digital 300	2/6.2 1/2 ATR-SL	$18,216 28 VDC	Includes two-digit-code diagnostics; directly replaces DME-40; tracks three channels simultaneously when used with CTL-32 and IND-42A (special order only) (CTL-32 controls nav receiver); digital signal processing; echo monitor. IND-42A indicator included. Displays 0-300 nm; 0-999 knots; 0-120 min.
	DME-442 C66b	gas discharge	ARINC 568 serial digital (CSDB) ARINC 429 300	2/6.2 1/2 ATR-SL	$21,292 28 VDC	Tracks three channels simultaneously when linked to CTL-32, IND-42A; decodes and displays station ident; digital signal processing; echo monitor; built-in diagnostics; includes IND-42A (special order only).
	DME-4000 C66c	gas discharge	CSDB ARINC 429 300	2/4.4 2.5 MCU	$19,907 28 VDC	Tracks three channels simultaneously when linked to CTL-32, IND-42; decodes and displays station ident; digital signal processing; echo monitor; built-in diagnostics; includes IND-42
Wulfsberg Electronics 6400 Wilkinson Dr. Prescott, Ariz. 86301 (928) 708-1550 (928) 541-7627 www.wulfsberg.com	CDM-451 Flitetline C66B	LCD	3 ARINC 429 2 ARINC 568 1 40-bit serial 325	1/3.6 3.87 x 3,27 x 13.33	$21,785 18 - 33 VDC	Three-channel scanning. ARINC 429 interface; nav frequency display in DME hold mode; six-wire analog continuous self-test.
	SD-442B ARINC 568	LCD	3 ARINC 429 1 40-bit serial 325	1/0.47 3.27 x 1.55 x 2.5	$6,580	

LONG-RANGE NAVIGATION SENSORS

Manufacturer	Model System Type TSO	Inputs Outputs	Units/Weight (lb) Size or Form Factor	Price Power Required	Remarks
Honeywell Aerospace 1944 East Sky Harbor Circle Phoenix, Ariz. 85034 (800) 601-3099 Fax: (602) 365-3343 www.honeywellaes.com	Laseref V Micro IRS Laser Gyro IRS C4c, C5e, C6d	ARINC 429 ARINC 429	2/9.9 6.6 x 6.4 x 6.3	$180,000 28 VDC	All digital; passive cooling; automatic mode control; align-in-motion when supplied with ARINC 743A GPS imputs.
	GR-550 GPS sensor C-129 B1/C1	ARINC 429 ARINC 429 (ARINC 743A)	1/6.0 2.6 x 8.5 x 9.5	$26,297 28 VDC 115 VAC	Complies with ARINC 743A; integral satcom filter.
	Laseref IV Laser Gyro IRS C4c, C5e, C6d	ARINC 419/429 ARINC 429/ASCB	2/16.9 4.9 x 7.6 x 13.1	$237,000 28 VDC or 115 VAC	All digital; 4 MCU ARINC 704.
	Special Missions Laseref V NA	ARINC 429 ARINC 429	2/9.9 6.6 x 6.4 x 6.3	$215,000 28 VDC	
Rockwell Collins 400 Collins Rd. N.E. Cedar Rapids, Iowa 52498 (319) 295-4085 Fax: (319) 295-2297 www.rockwellcollins.com	GPS-4000A GPS sensor C129 B1	ARINC 429 (complies with ARINC 743A) ARINC 429	1/6.9 2 MCU	$24,356 28 VDC	Upgradable to provide precision approach capability.

TRANSPONDERS

Manufacturer	Model TSO	Modes Power Output (W)	Units/Weight (lb) Size or Form Factor	Price Power Required	Remarks
Garmin International 1200 E. 151st St. Olathe, Kan. 66062 (800) 800-1020 (913) 397-8200 Fax: (913) 397-8282 www.garmin.com	GTX 330 C112 Class 2A	A, C, S 250	1/3.0 1.6 x 6.25	$4,995 11 - 33 VDC	Solid-state Mode-S, keypad entry, remote ident, front-panel entry for flight ident, altitude monitor with vice alert, flight timers. TIS compatible in the United States.

TRANSPONDERS

Manufacturer	Model TSO	Modes Power Output (W)	Units/Weight (lb) Size or Form Factor	Price Power Required	Remarks
Garmin International 1200 E. 151st St. Olathe, Kan. 66062 (800) 800-1020 (913) 397-8200 Fax: (913) 397-8282 www.garmin.com	GTX 330D C112 Class 2A	A, C, S 250	1/3.0 1.6 x 6.25 x 9.75	$9,995 11 - 33 VDC	Diversity Mode-S, solid-state keypad entry, remote ident, front panel entry for flight ident, altitude monitor with voice alert, flight timers. TIS compatible in the United States.
	GTX 32 C74c Class 1A	A,C 200	1/2.2 1.71 x 6.30 x 8.78	$2,925 11 - 33 VDC	Remote mount, solid-state, remote ident capability, flight timers.
Honeywell Aerospace 1944 East Sky Harbor Circle Phoenix, Ariz. 85034 (800) 601-3099 Fax: (602) 365-3343 www.honeywellaes.com	Bendix/King KT 76A C47c Class 1B	A, C 250	1/3.1 6.25 x 1.6 x 10.0	$1,760 14 or 28 VDC	Automatic reply-light dimmer; system test; remote-ident capability adapter available. Add $90 for 28 VDC converter.
	Bendix/King KT 76C C47c	A, C 250	1/3.1 6.25 x 1.63 x 10.73	$2,210 11 - 33 VDC	Slide-in replacement for KT 76A. Programmable VFR code; remote ident capability; gas-discharge digital display; push-buttom code entry.
	Bendix/King KT 71 C47c Class 1A	A, C 250	1/3.9 6.25 x 1.63 x 10.0	$5,240 11 - 33 VDC	Gas discharge display; encoding altimeter output.
	Bendix/King KT 73 C112	A, C, S, TIS 200	1/3.6 6.25 x 1.63 x 10.82	$5,230 10 - 32 VDC	
	Bendix/King KT 70 C112 Class 1A	A, C, S 250	1/3.9 6.25 x 1.63 x 10.0	$5,350 11 - 33 VDC	Mode S transponder; non-diversity surveillance only; includes discrete address memory module; displays encoding altimeter output; gas discharge display.
	RCZ 854G C37c/C38c C74c Class 3A	A, C 250-625	2/11.0 14.0 x 3.0 x 8.9	$9,972 ($23,514) 28 VDC	Price shown is the transponder portion in the Primus II integrated radio system. Price in () includes a VHF com; built-in diagnostics including RF; remote mount.
	RCZ 854F C37c/C38c C74c Class 3A	A, C. S 250-625	2/11.0 14.0 x 3.0 x 8.9	$17,262 ($28,122) 28 VDC	Price shown is the transponder portion in the Primus II integrated radio system. Price in () includes a VHF com; built-in diagnostics including RF; remote mount.
	Bendix/King MST 67A C112	A, C, S 250-630	2/8.5 1/4 ATR	$28,340 115 VAC, 400 Hz	Mode S transponder; includes KFS 578A control head; non-diversity; TCAS diversity available.
	RCZ 833K C37c/C38c C74c Class 3A	A, C. S (diversity) 250-625	2/11.0 14.0 x 3.0 x 8.9	$29,304 ($46,719) 28 VDC	Price shown is the transponder portion in the Primus II integrated radio system. Price in () includes a VHF com; built-in diagnostics including RF; remote mount.TCAS II Change 7.0 and Elementary Surveillance compatible.
Rockwell Collins 400 Collins Rd. N.E. Cedar Rapids, Iowa 52498 (319) 295-4085 Fax: (319) 295-2297 www.rockwellcollins.com	TDR -94D C112 Class 3	A, C, S 250-625	2/9.7 4.9 x 3.3 x 12.5	$37,692 28 VDC	Includes CLT-92E; DSDB control; two stored codes. Mode S transponder. TCAS II Change 7.0 and Mode S specific services compatible.

WEATHER RADAR

Manufacturer	Model TSO Circuits	Ranges Power Output (Peak KW)	Dish Size & Beam Width (in./deg.)	Scan Pulse Wdth. Looks/Min.	Stablztn. Stabl. Sig. Ant. Tilt	Display Interface Colors	Scope (dia./in.) Indicator Size	Units/ Weight RT. Size	Price Power	Remarks
Honeywell Aerospace 1944 East Sky Harbor Circle Phoenix, Ariz. 85034 (800) 601-3099 Fax: (602) 365-3343 www.honeywellaes.com	Bendix/King ART 2000 C63c vertical profile, ext. STC, tgt., wx. alert, atten., comp., variable gain-map mode	10, 20, 40. 80,, 160 4	10/10 12/8 15	90° or 100° 4 ARINC 429	30° 20-220 mv/det. ±15°	KMD 850 EFIS 4	NA NA	1/9.9 10. 28 dia.	$26,260 28 VDC; 10, 26, 115 VAC, 400 Hz	Vertical profile feature: scans horizontally or vertically on track line selected by pilot. Alpha-numeric display of range, function and tilt angle.
	Bendix/King RDR 2100 C63c Vertical profile; extended STC; wx attenuation compensation; variable gain in map mode; wx alert; autotilt	5, 10, 20, 40, 80, 160 ,240, 320 6.0	12/8 10/10	90°, 100° 120° range dependent 15	±30° pitch & roll 20/220 mv/deg. ARINC 429 ±15°	KMD 850 EFIS 5	NA NA	1/9.9 10.28 dia.	$33,320 28 VDC; 10, 26, 115 VAC, 400 Hz	Vertical profile feature: scans horizontally or vertically on track line selected by pilot; Alpha-numeric display of range, function and tilt angle. KMD 850 MFD, $13,440.
	Primus 440 C63c REACT; preset & variable gain	2.5, 5, 10 25, 50, 100, 200 10	12/7.9	120° 2 12	±30° 50 or 200 mv/deg. or ARINC 429 ±15°	ARINC 453/708 checklist, data nav, EFIS, MFD, LSZ-860 4	4 4.8 x 6.25 x 12.24	2/15.8 5.0 x 7.6 x 15.0	$39,382 28 VDC	Single receiver/transmitter/antenna pedestal LCD indicator for non-EFIS applications, $27,857.
	Primus 660 C83c REACT; GMAP target alert, preset & variable gain	2.5, 5, 10 25, 50, 100, 200, 300 10	12/7.9, 18/5.6	60° or 120° 2 12/24	±30° 50 or 200 mv/deg. or ARINC 429 ±15°	ARINC 453/708, checklist, data nav, EFIS, MFD, LSZ-860 4	4 4.81 x 6.25 x 12.24	2/15.8 5 x 7.6 x 15.0	$53,296 28 VDC	Radar indicator for non-EFIS applications, add $25,528. Single receiver/transmitter/antenna pedestal LCD indicator for non-EFIS applications, $27,857.
	Primus 880 C63c Doppler turb. detec., compensated, tilt, REACT, GMAP target alert, preset & variable gain	2.5, 5, 10, 25, 50, 100, 200, 300 10	12/7.9, 18/5.6 24/4	60° or 120° 2 12/24	±30° 50 or 200 mv/deg. or ARINC 429 ±15°	ARINC 453/708 checklist, data nav,' EFIS, MFD, LSZ-860 5	5 4.8 x 6.25 x 12.24	2/15.8 5.0 x 7.6 x 15.0	$85,998 28 VDC	Radar indicator for non-EFIS applications, add $35,532.
	Primus 700A C63c REACT; ground & sea clutter red.; turb. detect-preset & variable gain	.5, 1, 2.5, 5, 10, 25, 50, 100, 200, 300 10	10/10, 12/7.9, 10 x 14/ 10 x 7.1, 18/5.6, 24/4	60° or 120° 6 12/24	±30° 50 or 200 mv/deg. or ARINC 429 ±15°	ARINC 429/708 checklist, data nav, EFIS, lightning sensor LSZ-860 5	5 4.81 x 6.25 x 12.24	4/37 5.0 x 7.6 x 15.0	$94,347 28 VDC; 400 Hz	Short-range and high resolution system for special search and surviellance missions, displayed menus. Minimum detect range at 450 ft. All full dual-mode operation pilot and copilot; for non-EFIS application, add $35,532.
	Primus 701A C63c, C102 REACT; ground clutter reduction; turbulence detect-preset & variable gain	1/2, 1, 2.5, 5, 10, 25, 50, 100, 200, 300 10	10/10, 12/7.9, 10 x 14/10 x 7.1, 18/5.6 24/4	60° or 120° 6 12/24	±30° 50 or 200 mv/deg. or ARINC 429 ±15°	ARINC 429/709 checklist, data nav, EFIS, lightning sensor 6	5 4.81 x 6.25 x 12.24	4/39 5.0 x 7.6 x 15.0	$113,527 28 VDC; 115 VAC, 400 Hz	Short-range and high-resolution system for special search and surviellance missions; displayed menus and AC 90-80A specified clear zones. Allows full dual-mode operation for pilot and copilot; for non-EFIS application, add $35,532.

WEATHER RADAR

Manufacturer	Model / TSO / Circuits	Ranges / Power Output (Peak KW)	Dish Size & Beam Width (in./deg.)	Scan / Pulse Wdth. / Looks/Min.	Stablztn. / Stabl. Sig. / Ant. Tilt	Display Interface / Colors	Scope (dia./in.) / Indicator Size	Units/ Weight / RT. Size	Price / Power	Remarks
Rockwell Collins 400 Collins Rd. N.E. Cedar Rapids, Iowa 52498 (319) 295-4085 Fax: (319) 295-2297 www.rockwellcollins.com	WXR-800 C63 range-adjusted contour; ground	5, 10, 25, 50, 100 200, 300 5	12/8	120° see remarks 14	±30° pitch & roll digital 429 or 200 mv/deg. ±15°	EFIS-85, EFIS-86, MFD 2000 FlightMax 950 4	varies by indicator	2/20.4 15.0 x 11.5	$46,788 28 VDC	All solid-state Doppler pulse weather avoidance radar; one-piece design; six pluse widths — 1.7° to 28.8°. Separate function switch for each pilot.
	WXR-840 C63c range-adjusted contour; ground clutter suppression	5, 10, 25, 50, 100, 200, 300 0.024	12/8, 14/7, 18/6	60° or 120° see remarks 13	±30° pitch & roll digital 429 or 200 mv/deg. ±15°	EFIS-85, EFIS-86, MFD-2000 FlightMax 950 4	varies by indicator	2/20.4 15.0 dia. x 11.5	$78,200* 28 VDC	All solid-state Doppler pulse wx avoidance radar. One-piece design. Designed as EFIS wx sensor. Six pulse widths, 1.7 to 28.8. Separate function selection for each pilot (mode, range, gain, tilt and target alert). *Special order pricing
	TWR-850 C63c range-adjusted contour; ground clutter supression	5, 10, 25, 50, 100, 200, 300 0.024	12/8, 14/7, 18/6	60° or 120° see remarks 13	±30° pitch & roll digital 429 or 200 mv/deg. ±15°	EFIS-85, EFIS-86, MFD-2000 FlightMax 950 4	varies by indicator	2/20.4 15.0 dia. x 11.5	* 28 VDC	Solid-state Doppler turbulence detection, pulse wx avoidance radar; designed as EFIS wx sensor; six pulse widths, 1.7 to 28.8; separate function selection for pilot (mode, range, gain, tilt, turbulence and target alert). *Special order pricing.

RADAR ALTIMETERS

Manufacturer	Model / TSO	Alt. Range / Pitch/Roll Limits	Accuracy	Display	Units/Weight (lb)	Price / Power Required	Remarks
Honeywell Aerospace 1944 East Sky Harbor Circle Phoenix, Ariz. 85034 (800) 601-3099 Fax: (602) 365-3343 www.honeywellaes.com	Bendix/King KRA 10A C87	-20 - 2,500 ft. ±20°/±20°	±5 ft./ 50 - 100 ft., ±5%/ 100 - 500 ft., ±7%/ 500 - 2,000 ft.	pointer dial	3/3.8	$9,210 28 VDC	Continuous DH set; "skewed" antenna optional for mounting on angled aircraft surface.
	Bendix/King KRA 405B C87	-20 - 2,000 ft. ±20°/±25°	0 - 100 ft., 34 ft. or 3% whichever is greater, 500 - 2,500 ft. ±5%	pointer dial	2/10.7	$21,880 28 VDC	Compatible with Honeywell Mark VI GPWS/EGPWS continuous DH set; tracking to 2,500 ft.; expanded helicopter version available; night-vision goggle version available. Optional built-in tone generator.
	AA-300 C87	0 - 2,500 ft. ±20°/±30°	0 - 100 ft. ± 3 ft. 100 - 500 ft. ±3% 500 - 2,000 ft. ±4%	pointer dial	2/6.5	$24,749 28 VDC	Includes RA-315 indicator and two AT-300 antennas.
Rockwell Collins 400 Collins Rd. N.E. Cedar Rapids, Iowa 52498 (319) 295-4085 Fax: (319) 295-2297 www.rockwellcollins.com	ALT-4000 C87	0 - 2,500 ft. ±40°/±-50°	± 2 ft. or 2%	EFIS (analog version available)	2/6.8	$27,392 28 VDC	Interfaces to EFIS high-intensity monitor for Cat II/III certification. Includes two ANT-52 antennas.

THUNDERSTORM DETECTION SYSTEMS

Manufacturer	Model TSO	Search Arc Max Range	Information Display	Display Size Units/Weight	Price Power Required	Remarks
Honeywell Aerospace 1944 East Sky Harbor Circle Phoenix, Ariz. 85034 (800) 601-3099 Fax: (602) 365-3343 www.honeywellaes.com	LSZ-860 C110	60°, 120°, 360° 100 nm	three unique symbols represent three rates of occurrence for vertical lightning in a specific area	displays on Honeywell EFIS of various sizes 3/10.8	$20,100 28 VDC	Display stabilized in heading and velocity. Overlays weather radar display.
Insight Avionics, Inc. P.O. Box 194 Buffalo, N.Y. 14205 (716)852-3217 Fax: (905) 871-5460 www.insightavionics.com	Strike Finder C110a	360° 200 nm	LED	3 1/8 (diam.) 2/2.3	$4,995* 14 or 28 VDC	LED digital weather avoidance system. *Relative bearing selector option, $1,495. *B&CA* estimate. Storm distance and bearing using outer- and half-range rings in conjunction with 30° azimuth markers.
L-3 Avionics Systems 5353 52nd St. S.E. Grand Rapids, Mich. 49588 (616) 949-6600 Fax: (616) 285-4224 www.L-3com.com	WX-500 C110a	360° 200 nm	—	NA 2/3.43	$5,240* 11 - 32 VDC	Remote-mount sensor interfaces with OEM MFDs or radar indicator when paired with RGC250 (sold separately). 360° and 120° surveillance in 25-200 nm ranges; heading stabilization; cell- or strike-mode data selection. *Proccessor only.
	WX-950 C110a	360° 200 nm	CRT	3 ATI 2/3,74	$6,370* 11 - 33 VDC	Series II Stormscope: self-contained processor/display unit; 360° and 120° views in 200, 100, 50 and 25 nm ranges; heading stabilization; cell- or strike-mode data selection. *Display/processor only.
	WX-1000+ AN/AMS-2 C110a	360° 200 nm	CRT	3 ATI 3/10.95	$13,420* 10 - 32 VDC	Includes heading stabilization. *Processor only.
	WX-1000E (429 EFIS) C110a	360° 200 nm	—	depends on EFIS system 1/6.67	$13,460* 10 - 32 VDC	Provides output on EFIS display or radar indicator when paired with RGC35C (sold separately); includes three levels of activity, bearing and distance; optional displays for checklists. *Processor only.
	WX-1000E C110a	360° 200 nm	—	NA 2/10.95	$10,650* 10 - 32 VDC	Same as WX-1000+; accepts RS232 input from Loran-C and GPS receivers. *Processor only.
	WX-1000E (429 Navaid) C110a	360° 200 nm	—	3 ATI 2/10.95	$13,460* 10 - 32 VDC	Navaid option for use with ARINC 429-based nav systems. *Processor only.

BASIC AUTOPILOTS

Manufacturer	Model / TSO	Sensor Type / Servo Type	Attitude Modes: Roll / Pitch	Nav Modes	Units/Weight	Price / Power Required	Remarks
Meggitt Avionics/S-TEC One S-TEC Way Municipal Airport Mineral Wells, Texas 76067 (800) 872-7832 (940) 325-9406 Fax: (940) 325-3904 www.magic.aero	S-TEC System ThirtyALT C9c	accelero-meter DC electric	none altitude hold	none	3/4.0	$5,220 14 or 28 VDC	
	S-TEC System 40 C9c	1 rate gyro DC electric	command turn none	VOR/LOC/BC, GPS tracking	3/9,0	$6,170 14 or 28 VDC	Can be upgraded to System 50 or 60-2.
	S-TEC System Twenty C9c	enclosed in rate gyro DC electric	command turn none	VOR/LOC, GPS tracking	2/7.0	$6,170 14 or 28 VDC	Can be upgraded to System 30.
	S-TEC System 60-1 C9c	1 rate gyro DC electric	hdg. select none	VOR/LOC/BC, GPS/Loran capture and tracking	4/12.0	$7,630 14 or 28 VDC	Includes interfaces with all popular HSIs. Variable bank angle with airspeed; automatic three-level radio gain; can be upgraded to 60-2.
	S-TEC System 60 PSS C9c	no external sensors DC electric	none vertical speed hold; altitude hold; GS capture and track	GS capture and track	4/11.0	$7,920 14 or 28 VDC	Complements existing single roll-axis autopilot; auto/manual, electric trim optional, $2,195; may be upgraded to 60-2; altitude selector/alerter optional, $3,670.
	S-TEC System 50 C9c	1 rate gyro DC electric	command turn/hdg. select optional altitude hold	VOR/LOC/BC, GPS, Loran tracking	5/14.0	$9,670 14 or 28 VDC	Two-axis, roll and pitch autopilot; trim condition indicator std. Manual electric trim optional, $2,630. Can be upgraded to 60-2.
	S-TEC System Thirty C9c	enclosed in rate gyro plus pitch computer DC electric	command turn altitude hold	VOR/LOC/GPS/ Loran tracking	5/13.0	$9,670 14 or 28 VDC	DG option, $2,495
	S-TEC System 60-2 C9c	1 turn coord., 1 dir. gyro 1 press. transducer	hdg. select vertical speed and altitude hold	VOR/LOC/BC, Loran track and approach; GS capture and tracking	7/21.0	$13,510 14 or 28 VDC	Interfaces with all popular HSIs. Automatic/manual electric trim optional, $3,520; altitude/vertical speed selector/alerter optional, $3,670; can be upgraded to flight director.
	S-TEC System FiftyFiveX C9c	1 turn coord. 1 press. transducer	hdg. select digital vertical speed, altitude hold	VOR/LOC/ BC, GPS/Loran tracking and GS capture	5/17.0	$16,760 14 or 28 VDC	Interfaces with all popular HSIs. Automatic/manual electric trim optional, $3,520. Altitude/vertical speed selector/alerter optional, $3,670; can be upgraded to flight director.
	S-TEC System 65 C9c	1 turn coord., 1 dir. gyro 1 press. transducer	hdg. select manual and automatic modes	VOR/LOC/BC, GPS/Loran capture and tracking; GS capture and tracking	9/24.0	$24,070 14 or 28 VDC	

INTEGRATED FLIGHT CONTROL SYSTEMS

Manufacturer	Model	Air Data Attitude Sensors	Autopilot Flight Director	Power	Weight AP Only IFCS	Price AP Only IFCS	Remarks
Honeywell Aerospace 1944 East Sky Harbor Circle Phoenix, Ariz. 85034 (800) 601-3099 Fax: (602) 365-3343 www.honeywellaes.com	Primus 1000	micro DADC digital AHRS or IRS	IC-600 combined	28 VDC	varies by installation 13.0	varies by version	Digital fail-passive system. CAT II; ARINC 429 interfaces, two-, three-, four- or five-tube EFIS. Bombardier Learjet 40, 45 and 45XR; Embraer ERJ-135, 140 and 145; Cessna Bravo, Encore, Excel and Ultra.
	Primus 1000 CDS	micro DADC Digital AHARS	IC-615 combined	28 VCDC	varies by installation	varies by installation	Digital fail-passive system. CAT II; ARINC 429 interfaces; two to five flat-panel LCD EFIS. Cessna Citation XLS
	Primus 2000	micro DADC digital AHRS or IRS	IC-800 combined	28 VDC	varies by installation 15.0	varies by version	Digital, dual-channel fail-passive system. CAT II optional auto-throttle, dual-sensor monitoring; five- or six-tube EFIS. Bombardier Global Express and Global 5000; Cessna Citation X; Dassault Falcon 900C, 900EX.
	Primus Epic CDS	micro DADC digital AHRS or IRS	FZ-800 combined	28 VDC	varies by installation	varies by installation	Digital fail-passive system. CAT II, ARINC 429 interfaces. Two-, three- four- or five-tube EFIS. Sino Swearingen SJ30-2.
	Primus Epic ;	air data module and micro IRS	integrated modular avionics unit	28 VDC	varies by installation	varies by installation	Integrates all traditional avionics into modular avionics unit. Digital, dual-channel; full operational system. CAT II optional; auto-throttle, envelope protection. Includes two to five flat-panel LCDs with cursor controls. Agusta/Bell AB139; Citation SovereignDassault Falcon 900EX, 2000EX and 7X; Embraer 170, 175, 190 and 195; Gulfstream G500 and G550; Raytheon Horizon.
	Primus Epic Fly-by-Wire System	See Remarks					Integrates with Primus Epic System. Scalable architecture, performance and envelope protection augmentation. Embraer 170, 175, 190 and 195.
Meggitt Avionics/S-TEC One S-TEC Way Municipal Airport Mineral Wells, Texas 76067 (800) 872-7832 www.magic.aero	Magic 2100 DFCS	digital ADAHARS	Magic EFIS NA	14 or 28 VDC	14.5 NA	$65,900 NA	Optional EFIS ($53,900) and EIDS ($39,900).
Rockwell Collins 400 Collins Rd. N.E. Cedar Rapids, Iowa 52498 (319) 295-4085 Fax: (319) 295-2297 www.rockwellcollins.com	FCS-65	AHC-3000 remote vertical gyro or dual AHRS	APS-65 EFIS-84 (two tube)	28 VDC	varies by installation 50.6	varies by installation	Built-in diagnostics; digital Cat II certificated autopilot. Optional EFIS and AHRS. STC kit installer fabricated. Compatible with EFIS-84.
	FCS-85	ADS-86 dual AHRS AHC-3000	APS-85 EFIS-85 (three tube)	28 VDC, 115 VAC, 400 Hz	varies by installation	varies by installation	Available only as full, dual- channel, fail-passive, digital system; digital Cat II autopilot, 4- or 5-tube EFIS optional; ARINC 429 IRS interface available; includes yaw damper; extensive built-in diagnostics. STC kit installer fabricated. Compatible with EFIS-84

COLLISION AVOIDANCE SYSTEMS

Manufacturer	Model TSO	Display Interface Options	Processor Size Weight (lb)	Price	Remarks
ACSS, an L-3 Communications & Thales Company 19810 N. 7th Ave. Phoenix, Ariz. 85023 (623) 445-7000 Fax: (623) 445-7001 www.L-3com.com/acss	TAWS + C151b CLASS A C129b2	MFD, EFIS, weather radar display	2 MCU 7.5	$778,413*	Optional GPS; alerts based on standard aircraft climb capability plus Terrain Advisory Line and Avoid Terrain features. **B&CA* estimate.
	TAWS + Performance C151b CLASS A C129b2	MFD, EFIS, weather radar display	2 MCU 7.5	$91,481*	Optional GPS; alerts based on actual aircraft climb capability (performance) plus Terrain Advisory Line and Avoid Terrain features. **B&CA* estimate.
	TCAS 2000 RT-950/951 C119B	MDFD, EFIS, VSI/TCAS display	4 MCU - 16.0 6 MCU - 16.8	$150,461*	Standard positions on many regional and business jets including Bombardier, Cessna, Dassault, Embraer, Gulfstream, Raytheon. (SFE selectable on all Airbus and Boeing aircraft.) **B&CA* estimate.
	T^2CAS C119B C151a CLASS A C129b2	MFD, EFIS, weather radar display VSI/TCAS display	4 MCU - 14.7 6 MCU - 16.8	$222,820*	Combined TCAS and TAWS in 4- or 6-MCU with optional GPS. STCs available on Cessna, Raytheon and Piaggio aircraft. **B&CA* estimate.
Avidyne Corp. 55 Old Bedford Rd. Lincoln, Mass. 01773 (800) 284-3963 Fax: (614) 885-8307 www.avidyne.com	TAS 600 C-147	Avidyne EX500, EX5000 and MHD Garmin, Chelton, Honeywell, Sandel, Sagem, Universal, Meggitt, Rogerson Kratos	3.1 x 7.25 x 11.7 7.2 top and bottom antennas 3.24 x 2.76 x 5.14 22.5 oz. (combined)	$9,990	Designed for single-engine piston aircraft; seven-nm range, 3,500-foot vertical separation, 18,500-foot service ceiling. Head-up audible position alerting ("traffic! one o'clock! high! two miles!"); active interrogating, 30-second decision and 1,200-knot closure rate.
	TAS 610 C-147	Avidyne EX500, EX5000 and MHD Garmin, Chelton, Honeywell, Sandel, Sagem, Universal, Meggitt, Rogerson Kratos	3.1 x 7.25 x 11.7 7.2 top and bottom antennas 3.24 x 2.76 x 5.14 22.5 oz. (combined)	$14,990	Designed for mid-performance aircraft and helicopters; 12-nm range; 3,500-foot vertical separation; 25,000 foot service ceiling. Head-up audible position alerting ("traffic! one o'clock! high! two miles!); active interrogating, 30-second decision and 1,200-knot closure rate.
	TAS 620 C-147	Avidyne EX500, EX5000 and MHD Garmin, Chelton, Honeywell, Sandel, Sagem, Universal, Meggitt, Rogerson Kratos	3.1 x 7.25 x 11.7 7.2 top and bottom antennas 3.24 x 2.76 x 5.14 22.5 oz. (combined)	$20,990	Designed for high-performance aircraft and rotorcraft; 21-nm mile range; 9,900-foot vertical separation; 55,000 foot service ceiling. Head-up audible position alerting ("traffic! one o'clock! high! two miles!); active interrogating, 30-second decision and 1,200-knot closure rate.
L-3 Avionics Systems 5353 52nd St. S.W. Grand Rapids, Mich. 49512 (616) 949-6600 Fax: (616) 285-4224 www.L-3com.com	TCAS791A System (TCAS I) without display NA C118	EFIS, MDFD and IVSI Also displays wx radar using RGC-350 Radar Graphics Computer (sold separately)	NA NA	$56,460*	Active Traffic Collision Avoidance System (TCAS-I) designed to display on compatible EFIS, MFD, and IVSI displays. Contact factory for approved interfaces. *Fixed wing, top- or bottom-mount antenna or helicopter bottom mount antenna only. Intallation kit and options separate. Other conditions may apply.
	TCAS791A System (TCAS I) with CD-605 display NA C118	See remarks	NA NA	$65,870*	Includes TCAS791A System above plus CD-605 Dedicated Color Display: *CD-605 3-ATI Display, $11,410 additional. Installation kit $230 additional. Other conditions may apply.

COLLISION AVOIDANCE SYSTEMS

Manufacturer	Model TSO	Display Interface Options	Processor Size Weight (lb)	Price	Remarks
L-3 Avionics Systems 5353 52nd St. S.W. Grand Rapids, Mich. 49512 (616) 949-6600 Fax: (616) 285-4224 www.L-3com.com	SKY497 SkyWatch Traffic Advisory System NA NA	Contact factory for approved interfaces. Also can display on wx radar indicators using RGC-350 Radar Graphics Computer (sold separately)	NA NA	$13,900*	Active Traffic System using Transponder interrogation and reply (independent of radar coverage). Active surveillance 10 nm, tracks up to 30 intruder aircraft, and provides both aural and visual warnings. Single antenna system reduces installation costs. *Transmitter/receiver computer only. Installation kit and other options separate. Other conditions may apply.
	SKY497 SkyWatch Traffic Advisory System with display NA NA	Includes SkyWatch System above plus CRT display	NA NA	$18,890*	*Installation kit and other options separate. Other conditions may apply
	SKY899 SkyWatch HP Traffic Advisory System NA NA	Displays on compatible EFIS and MFDs; contact factory for approved interfaces.	NA NA	$20,980*	Active Traffic System using Transponder interrogation and reply (independent of radar coverage). Active surveillance 35 nm, tracks up to 35 intruder aircraft, and provides both aural and visual warnings. Single antenna system reduces installation costs. *Transmitter/Receiver Computer only. Intallation kit and other options separate. Other conditions may apply.
	SKY899 SkyWatch HP Traffic Advisory System with display NA NA	Includes SkyWatch HP System above plus CRT display	NA NA	$25,980*	*Installation kit and other options separate. Other conditions may apply.
	SKY899 SkyWatch HP (TCAS 1) without display NA	See remarks	NA NA	$20,980*	Active Traffic System using Transponder interrogation and reply (independent of radar coverage). Active surveillance 35 nm, tracks up to 35 intruder aircraft, and provides both aural and visual warnings. Single antenna system reduces installation costs. Install as a TCAS I using a compatible color display (not supplied) and NY156 TCAS directional antenna. *Installation kit and other options separate. Other conditions may apply.
	LandMark TAWS 8000 System Class B C 151a	See remarks	NA NA	$10,620*	Remote processor offers predictive warning functions using position data from a GPS receiver, flight configuration and an internal terrain and obstacle database. Both aural and visual warnings are issued whenever potential controlled flight into terrain (CFIT) situations arise. Terrain information can be displayed on TAWS-compatible ARINC 453 EFIS, ARINC 453 weather radar indicators and compatible MFDs. Display on non-ARINC 453 radar indicators requires the RGC350 Radar Graphics Computer (sold separately). A baro-corrected altitude input is required. *Intallation kit and other options separate. Other conditions may apply.

COLLISION AVOIDANCE SYSTEMS

Manufacturer	Model / TSO	Display Interface Options	Processor Size / Weight (lb)	Price	Remarks
L-3 Avionics Systems 5353 52nd St. S.W. Grand Rapids, Mich. 49512 (616) 949-6600 Fax: (616) 285-4224 www.L-3com.com	LandMark TAWS 8100 System Class B NA	MFD, EFIS or radar indicator	NA NA	$9,750*	Features a WAAS-GPS sensor. Eliminates the need for multiple inputs from other aircraft sensors, simplifying the installation. Compatible display required to complete the installation. Operating autonomously, can provide the highest integrity terrain data without GPS, ADC, or OAT inputs. 320 nmi range. *Installation kit and other options separate. Other conditions may apply.
Honeywell Aerospace 1944 East Sky Harbor Circle Phoenix, Ariz. 85034 (800) 601-3099 Fax: (602) 365-3343 www.honeywellaes.com	Bendix/King KGP 560 C151 Class B	KMD 550 MFD, KMD 850 MFD and most MFDs	2.2 x 4.15 x 6.25 1.5	$10,990	EGPWS exceeds Class B requirements. Provides aural and visual warnings; Internal GPS; worldwide database by region.
	KGP 860 C151 Class B	KMD 550 MFD, KMD 850 MFD and most FMFDs	2.2 x 4.15 x 6.25 1.5	$13,990	EGPWS exceeds Class B requirements. Provides aural and visual warnings; internal GPS; worldwide database by region. EFIS displays additional warning modes.
	Bendix/King KTA 870 C147	KMD 550 MFD, KMD 850 MFD and most MFDs	4.5 x 7.0 x 13.8 8.75	$22,550	Traffic Advisory System (TAS) is an active system providing aural and visual advisories. Single or dual directional antennas.
	Bendix/King KMH 880 C147, C151, Class B	KMD 550 MFD, KMD 850 MFD and most MFDs	4.5 x 7.0 x 13.8 8.75	$29,990	Traffic Advisory System (TAS) and EGPWS in one box. Active traffic system providing aural and visual adviories. Single or dual directional antennas.
	KTA 970 C118	dual-color, flat-panel LCD combined IVSI/TA display, KMD 550 EFIS KMD 850 or weather radar	4.5 x 7.0 x 13.8 8.75	$28,720	TCAS I system.
	Bendix/King KMH 980 C118, C151 Class B	KMD 550 MFD, KMD 850 MFD and most MFDs,	4.5 x 7.0 x 13.8 9.68	$38,280	TCAS I and GA-EGPWS.
	CAS 66A C118	dual-color, flat-panel LCD combined IVSI/TA display, KTA 870, KMH 880, EFIS or weather radar	½ ATR-S (4 MCU) 17.0	$95,645	TCAS I system. Includes processor, control panel, directional antenna and IVSI/TA display. Does not include installation kits. Upgradable to TCAS II.
	CAS 67A C119a/b	dual-color, flat-panel LCD combined IVSI/TA/RA display (included in price shown). Also can interface with KMD 550 MFD, KMD 850 MFD, EFIS or weather radar	½ ATR-S (4 MCU)	$222,360	TCAS II system. Requires Mode S transponder. Includes control panel, IVSI/TA/RA display. Does not include installation kits. Dual directional antenna.
	Mark XXI C118 Class B	KMD 550 MFD, KMD 850 and most MFDs	4.5 x 7.0 x NA 1.5	$13,790	Helicopter EGPWS

COLLISION AVOIDANCE SYSTEMS

Manufacturer	Model TSO	Display Interface Options	Processor Size Weight (lb)	Price	Remarks
Honeywell Aerospace 1944 East Sky Harbor Circle Phoenix, Ariz. 85034 (800) 601-3099 Fax: (602) 365-3343 www.honeywellaes.com	Bendix/King KMH 880 C147 C151 Class B	KMD 550 MFD, KMD 850 and most MFDs	2.2 x 4.15 x 6.25 1.5	$29,990	EGPWS and traffic advisory system (TAS) in one box. Worldwide data base by region.
	Mark VI	KMD 550 MFD, KMD 850 and most MFDs	6.2 x 3.0 x 12.1 3.5	$26,168	EGPWS exceeds Class A requirements. Provides aural and visual warnings; with or without internal GPS. Worldwide database by region.
	Bendis/King KMH 980 C118 Class B	KMD 550 MFD, KMD 850 and most MFDs	4.5 x 7.0 13.8 9.68	$38,280	TCAS I and EGPWS inputs
Rockwell Collins 400 Collins Rd. N.E. Cedar Rapids, Iowa 52498 (319) 295-1000 Fax: (319) 295-2297 www.rockwellcollins.com	TCAS 4000 C119 (C119a when issued)	Collins EFIS, MFD TCAS compatible VSI (RA) Collins TVI-920 (RA, TA)	4 MCU 17.0	$414,044*	TCAS II system. European ACAS compatible Mode S Level III. AC/DC in one part number includes control panel and two TRE antennas. Displays range/alt. separation from traffic. Max range 3 mi. Two surveillance volumes and MSL of traffic. Top/bottom antennas to optimize coverage. Upgrades to 8800 Gold. *Typical installation
Avidyne (formerly Ryan) 55 Old Bedford Rd. Lincoln, Mass. 01773 (800) 284-3963 www.avidyne.com	9900BX TAS C147 Class A C113	Avidyne, Chelton, Collins, Garmin, Honeywell, Universal and other MFDs; ARINC 429 and RS232; see remarks	7.25 x 3.1 x 11.675 6.38	$20,600 $21,600 with opt. 1/2 3 ATI alphanumeric display $28,590 with opt. 3ATI multi-hazard display	Active Traffic Advisory System (TAS) with range over 20 miles. Patented top/bottom phase-array antennas for optimum coverage. Exclusive “Audible Position Alerting” announces “Traffic, 12:00 high! 1 mile” for faster visual acquisition of target. Capable of operating with four or more displays simultaneously.
Universal Avionics Systems Corp. 3260 E. Universal Way Tucson, Ariz. 85706 (520) 295-2300 (800) 321-5253 Fax: (520) 295-2395 www.uasc.com	TAWS A C151b C92c TAWS B C151b C92c	Universal Avionics EFI-890R MFD-640 UNS FMS (5-in. display) Honeywell numerous weather radar, MFD and EFIS displays Rockwell Collins numerous weather radar, MFD and EFIS displays Smiths BAE ATP EFIS additional display options available	2 MCU LRU 9.6	TAWS A $37,500 TAWS B $23,000 28 VDC	Worldwide terrain database with 480+MB data. High-resolution analog video views; 3-D perspective view; profile view; map view. Map view of terrain can be output using ARINC 708 or WXPF formats for interface with various existing weather radars.

COCKPIT VOICE RECORDERS (CVR)/FLIGHT DATA RECORDERS (FDR)

Manufacturer	Type Model TSO	Recording Medium Duration	Size Weight (lb)	Price Power Required	Remarks
Honeywell Aerospace 1944 East Sky Harbor Circle Phoenix, Ariz. 85034 (800) 601-3099 Fax: (602) 365-3343 www.honeywellaes.com	CVR AR 30 CVR 980-6023-001 ED 56A, C123a	solid-state, digital 30 min.	9.5 x 5.88 x 5.75 8.8	$15,997 28 VDC	Non-ARINC size, with underwater locator beacon; control panel and mounting tray not required. ARINC 557 and ARINC 757.
	CVR SSCVR 980 6020-011 ED 56A, C123	solid-state, digital 30 min.	½ ATR-S 11.5	$21,770 28 VDC 115 AC	Solid-state CVR with underwater locator beacon; ARINC 557 and ARINC 757.
	CVR AR 120 CVR 980-6023-002 ED 56A, C123a	solid-state, digital 120 min.	9.5 x 5.88 x 5.75 8.8	$19,997 28 VDC	Non-ARINC size with underwater locator beacon; control panel and mounting tray not required. ARINC 557 and ARINC 757.
	CVR SSCVR 980-6022-011 ED 56A, C123	solid-state, digital 120 min.	½ ATR-S 11.5	$27,042 28 VDC 115 AC	Solid-state CVR with underwater locator beacon. ARINC 557 and ARINC 757.
	FDR AR FDR 980-4710-00X ED 55, C124a	solid-state, digital 25 hrs. @64, 128 256 wps	9.5 x 5.88 x 5.75 8.8	$18,814 to $28,201 28 VDC	Non-ARINC FDR, ARINC 717, 429. Mounting tray not required.
	FDR SSFDR 980-4700-0XX ED 55, C124	solid-state, digital 25 hrs. @64, 128, 256 wps	½ ATR-L or S 11.5 (short) 13.5 (long)	$19,479 to $33,166 115 VAC 28 VDC	Solid-state FDR; ARINC Form Factor; underwater locator beacon. ARINC 747, 573, 717. fire test to ED 56a.
	CVR/FDR AR Combi 980-6021-06X C124a, ED 55	solid-state, digital 30 min. voice; 25 hr. data @64, 128, 256 wps	9.5 x 5.88 x 5.75 8.8	$29,046 to $33,166 28 VDC	Combination CVR/FDR; non-ARINC size. Mounting tray not required. Three or two crew channels; one area mic.
	CVR/FDR AR Combi 980-6021-06X C124a, ED 55	solid-state, digital 60 min. voice; 10 hr. data @64, 128, 256 wps 25 hr. data	9.5 x 5.88 x 5.75 8.8	$29,046 to $33,166 28 VDC	Combination CVR/FDR; non-ARINC size. Mounting tray not required. Three or two crew channels; one area mic.
	DVDR/FDR AT Combi 980-6025-001 ED-56A, C123a	solid-state. digital 120 min. voice; 25 hr. data @64, 128, 256 wps	½ ATR-S 11.5	$35,580 28 VDC	Combination CVR/FDR; ARINC Form Factor. Mounting tray required. Data download through front access PCMCIA.
Universal Avionics Systems Corp. 3260 E. Universal Way Tucson, Ariz. 85706 (520) 295-2300 Fax: (520) 295-2395 www.uasc.com	CVR SSCVR-30B C123A	solid-state, flash-memory 30 min.	½ ATR-S 13.0	$12,500 28 VDC	Six channels (4 voice, 1 time, 1 rotor speed); maintenance on condition; on-board aircraft testing/diagnostics with portable test set; ED 56A, ARINC 757/557 compatible. Several control unit options available.
	CVR SSCVR-120 C123a	solid-state, flash memory 120 min.	½ ATR-S 13.0	$16,500 28 VDC	Six channels (4 voice, 1 time, 1 rotor speed); maintenance on condition; on-board aircraft testing/diagnostics with portable test set; ED 56A, ARINC 757/557 compatible. Several control unit options available.

HEAD UP DISPLAYS

Manufacturer	Model	Inputs / Outputs	Units/Weight (lb) / Size or Form Factor	Price / Power Required	Remarks
Honeywell Aerospace 1944 East Sky Harbor Circle Phoenix, Ariz. 85034 (800) 601-3099 Fax: (602) 365-3343 www.honeywellaes.com	Honeywell/ BAE Systems HUD-2020	ARINC 429, ASCB, discretes, analog, enhanced vision sensor	3/53.0 1/2 ATR	$470,000 28 VDC	Certificated for the Gulfstream IV, IV-SP and V. Enchaned Vision System (EVS) certified.
	Visual Guidance System (VGS*)	digital	3/35.0	(available from Gulfstream) 28 VDC	Certified for Gulfstream 550. Enhanced Vision System (EVS) certified. *BAE Systems
Rockwell Collins (Flight Dynamics) 166000 S.W. 72nd Ave. Portland. Ore. 97224 (503) 443-3050 Fax: (503) 443-3070 www.flightdynamics.com	HGS-4000 NA	ARINC 429, various discretes, enhanced vision, synthetic vision	48.0 NA	$524,560	Category III HUD available on a number of business and regional jet aircraft. Non-CAT III on Bombardier Challenger 604.

AIRCRAFT SITUATION DISPLAYS

Manufacturer	Model / TSO	Display / Display Size	Inputs	Outputs	Units/Weight (lb) / Size or Form Factor	Price / Power Required	Remarks
Aspen Avionics 8360 Corona Loop N.E. Albuquerque, N.M. 87113 (505) 856-5034 Fax: (505) 797-1222 www.aspenavionics.com	AT300 Hazard Awareness Display C8d C113	AMLCD 3.0 in.	VSI, GPS	display pilot selectable zoom scales of 5, 10, 20, 40, 60, 80 and 100 nm	1/1.0 3.3 x 3.3 x 3.8	$3,995 12 or 28 VCD	Unit can replace the primary Vertical Speed Indicator in standard 3-inch instrument cutout. Shows aircraft vertical speed, graphically depicts the current GPS leg and active waypoint on the moving map display, and shows either side view terrain or textual GPS navigation information (current wpt, distance, groundspeed, etc.). The unit also displays airport symbols for all hard surfaced U.S. airports. Continuously displays current aircraft track and current aircraft height above ground (derived from the terrain database and barometric altitude). 15 Arc Second (1/4 mile) resolution full continental US terrain and obstacle coverage.
Avidyne Corp. 55 Old Bedford Rd. Lincoln, Mass. 01773 (800) 284-3963 Fax: (614) 885-8307 www.avidyne.com	Multi-Hazard Display (MHD) C147 C118	AMLCD 3ATI	RS 232 ARINC429 ARINC 568 (DME)	ARINC 429	2.0/0.9 kg 3.26 x 3.26 x 8.5	$7,990 $10,990 with NVG 10 - 30 VDC	Interface applications with Avidyne TAS600-Series, Stormscope WX-500, Honeywell Class B TAWS (EGPWS), TCAS I, NVG compatible, DME
	9900BX MHD C147 C118, C113	AMLCD 3 ATI	see remarks	audible position alerting and integral altitude alerter annunc. ARINC 429	1/30 oz. 28 VDC	$7,999 - $28,590*	4-port MFD interface capability; provides 360° graphical view of traffic; displays traffic information at 5-10 mi. range and over 20 mi. range; can scale down to 1 mi. ADS-B compatible. MFD partnerships with 16 other OEMs. Prices shown for standalone MHD and with full 9900BX system. **B&CA* estimate.
Chelton Flight Systems 1109 Main St. #560 Boise, Idaho 83702 (208) 389-9959 www.cheltonflight systems.com	EFIS C113 C110a C151b C92C	LCD 6.4-in. diagonal	ARINC 429, Stormscope WX500, TCAS, TCAD, ARINC, RMI, ADF, FMS	display, annunciators and aural warnings	— 5.5 x 6.25 x 4.5	$70,000 one screen 11 - 33 VDC	TAWS Classes A, B and C available. Other optional adapters, accessories and software available. Terrain database, navigation and obstruction data available by subscription. (See also Chelton Synthetic Vision EFIS in MFD category.) Includes all systems.

AIRCRAFT SITUATION DISPLAYS

Manufacturer	Model TSO	Display Display Size	Inputs	Outputs	Units/Weight (lb) Size or Form Factor	Price Power Required	Remarks
Eventide, Inc. One Alsan Way Little Ferry, N.J. 07643 (201) 641-1200 Fax: (201) 641-1640 www.eventide.com	ARGUS 5000/7000 C113	monochrome CRT 5000: 3.2 x 3.2 7000: 3.2 x 4.8	ARINC, RMI Stormscope, ADF, Loran, GPS and FMS via RS 232 or RS 422*	—	5000: 1/3.5 7000: 1/4.5 5000: 3 ATI 3.2 x 3.2 x 10.25 7000: 3.2 x 4.8 x 10.75	5000: $4,495 7000: $5,495 U.S & No. Am. databases; $5,995, international database 11-33 VDC	*Optional ARINC 419 and 429 adapter, $995; ARINC RMI adapter, $2,450. Optional ARINC weather adapter, $1,990. Other optional adapters, accessories and software available. Database updates and Internet access available at additional cost. Ryan TCAD display software, $495.
	ARGUS 5000CE/ 7000CE C113	four-color CRT 5000CE: 3.2 x 3.2 7000CE: 3.2 x 4.8	ARINC, RMI Stormscope, ADF, Loran GPS and FMS via RS 232 or RS 422*	—	5000CE: 1/3.5 7000CE: 1/4.5 5000CE: 3 ATI-S 3.2 x 3.2 x 10.25 7000CE: 3.2 x 4.8 x 10.75	5000CE: $6,995 (U.S. & No. Am. database), $7,495 (international database) 7000CE: $8,995 (U.S. & No. Am. database), $9,495 (international database)	*Optional ARINC 419 and 429 adapter, $995; ARINC RMI adapter, $2,450. Optional ARINC weather adapter, $1,990. Other optional adapters, accessories and software available. Database updates and Internet access available at additional cost. Ryan TCAD display software, $495
Honeywell Aerospace 1944 East Sky Harbor Circle Phoenix, Ariz. 85034 (800) 601-3099 Fax: (602) 365-3343 www.honeywellaes.com	Bendix/King KMD 150 none	LCD 5-in. diagonal	RS 232, WX 500	—	1/3.3 4.0 x 6.25 x 6.9	$4,570, with GPS $3,870 without GPS 11 - 33 VDC	Available with or without VFR GPS. Internal terrain database included.
	Bendix/King KMD 250 C113	AMLCD 3-in. diagonal		display	1/3.47 3.0 x 6.31 x 6.9	$4,630, with GPS $4,140, without GPS	Multi-function display for IHAS 2000. Provides data link traffic and weather in a 3-in. high moving map with terrain and optional internal VFR GPS.
	Bendix/King KMD 550 C113, C63, C110a	LCD 5-in. diagonal	RS 232, ARINC 429, datalink, EGPWS, traffic, NTSC video & WX 500	display	1/5.0 4.0 x 6.2 x 10.0	$7,990 11 - 33 VDC	Multi-function display for IHAS 5000 (Integrated Hazard Awareness System). Can be interfaced to display GPS, TIS, TAS, FIS, EGPWS, Wx radar 500 and NTSC video. Includes internal terrain and obstacle database.
	Bendix/King KMD 850 C113, C63a, C110a	LCD 5-in. diagonal	RS 232, ARINC 429, radar, datalink, EGPWS, traffic NTSC video & WX 500	display	1/5.0 4.0 x 6.2 x 10.0	$13,440 11 - 33 VDC	Multi-function display for IHAS 8000 (Integrated Hazard Awareness System). Can be interfaced to display GPS, TIS, TAS, FIS, EGPWS, Wx radar 500 and NTSC video. Includes internal terrain and obstacle database.
L-3 Avionics Systems 5353 52nd St. S.E. Grand Rapids, Mich. 49512 (616) 949-6600 Fax: (616) 285-4224 www.L-3com.com/as	RGC350 C105	Existing radar indicator varies by system	ARINC 429 EFIS and RS 232	lightning and traffic data to pre-existing radar indicator	1/1.5 1.48 x 5.73 x 7.91	$6,145* 18-32 VDC	Interfaces with a variety of weather radar display systems from Bendix/King, Honeywell/Sperry/RCA and Rockwell Collins. System overlays existing weather radar display with choice of four modes of traffic and/or lightning data provided by Skywatch or TCAS I and/or Stormscope (WX-100E 429 EFIS or WX-500) and/or Landmark TSWS 8000. **B&CA* estimate.

AIRCRAFT SITUATION DISPLAYS

Manufacturer	Model TSO	Display Display Size	Inputs	Outputs	Units/Weight (lb) Size or Form Factor	Price Power Required	Remarks
Rockwell Collins 400 Collins Rd. N.E. Cedar Rapids, Iowa 52498 (319) 295-4098 Fax: (319)295-2297 www.rockwellcollins.com	FDS-2000 C3d, C4c, C5e, C6d, C34e, C35d, C36e, C40c, C41d, C52b, C66c, C87, C92c, C113, C115b C117a, C129a	AMLCD	ARINC 407 419, 429, 453, 552, 561, 568 analog	ARINC 429, AC discretes, DC discretes, DC analog	8/38.0 five 5 ATI displays	$129,900* 28 VDC	Configurable for flexible retrofit applications; weather radar, FMS maps, TCAS and terrain awareness interfaces. Wide viewing angle. Price includes five SATI displays and three display control panels. *Typical configuration.
Rogerson-Kratos 403 S. Raymond Pasadena, Calif. 91109 (626) 449-3090 www.rogersonkratos.com	5 ATI EFIS C3d, C4c, C5e, C6d, C8d, C9c, C34e, C35d, C36e, C40c, C41d, C52b, C63c, C66c, C67, C87, C92c, C113, C117a, C118, C119b, C129a, C147, C161a	AMLCD flat panel 5 ATI	analog synchro (XYZ, Sin/Cos) variable AC/DC discretes & digital ARINC 429, 419, 453, 735, RS-232	analog synchro (XYZ, Sin/Cos) variable AC/DC discretes & digital ARINC 429, 419, 453, 735, RS-232	1/7.75 5 ATI or 6.4 dia.	$42,000 28 VDC 44 w max	One, two or four programmable, self-contained flat-panel AMLCD EADI and EHSIs. Radio altimeter functions such as DH, expanded scale for landing helicopter operations, TCASI and II, and EGPWS display capability, in addition to standard ADI, HSI, bearing pointers, CDI, autopilot annunciation, flight director cross bars or 'V' bars. Upgrade packages available.
Sagem Avionics, Inc. 2701 Forum Dr. Grand Prairie, Texas 75052 (972) 314-3600 Fax: (972) 314-3640 www.sagemavionics.com Western division: 16923 Meridian E. Puyallup. Wash. 98375 (253) 848-6060 Fax: (253) 848-3555	MFD 5200 C113	AMLCS 5-in. diagonal	RS-232/422	NA	CDU: 2.26 RPU: 2.50 CDU: 4.75 x 6.25 x 2.0 RPU: 2.0 x 6.25 x 9.25	$8,995* 10-35 VDC	Moving map and terrain situational awareness with weather overlay. Interfaces with most navigation systems, BFGoodrich WX500 Stormscope, Ryan (Avidyne) TCAD, ARNAV DR-100 VHF WxLink, RCOM-100 Satcom, engine trend monitoring system. Optional engine trend-monitoring qualifies for P&W ETCM quality assurance program. Optional satcom or VHF data link display. **B&CA* estimate.
	ICDS-10, ICDS-8, ICDS-6 C63c C110a C113	AMLCD ICDS-10: 10.4 in. diagonal ICDS-8: 8.4-in diagonal ICDS-6: 6.4-in diagonal	all units provide: GPS, engine monitor, AHRS Stormscope, video, FLIR traffic, wx 4 -RS 232 2 - ARINC 429 2 - 453/708	all units provide: display, annunciators, aural warn. mission mgt., engine trend monitoring	ICDS-10: 6.26/ 8.2 x 11.12 x 2.7 ICDS-8: 4.2/ 6.55 x 9.75 2.8 ICDS-6: 3.0/ 5.52 x 7.01 x 4.025	$15,000 all units	When installed in an integrated panel can display moving map,GPS, engine information, weather displays, video and other aeronautical information and PFD. A terrain and obstruction database is standard with units configured as an MFD.
Sandel Avionics 2401 Dogwood Way Vista, Calif. 92081 (877) 726-3357 (760) 727-4900 Fax: (760) 727-4899 www.sandel.com	SA4500 EDAI C4c, C113	rear projection LCD	analog or ARINC 429	NA	1/3.75 4 ATI	$20,000 28 VDC	4 x 4 electronic ADI that accepts input from almost any gyro source. Incorporates flight director command bars, glideslope/localizer deviation scale, fast/slow indicator, rising runway symbol and mode annunciations. Pin selectable single-cue/split-cue display option.

AIRCRAFT SITUATION DISPLAYS

Manufacturer	Model TSO	Display Display Size	Inputs	Outputs	Units/Weight (lb) Size or Form Factor	Price Power Required	Remarks
Universal Avionics Systems Corp. 3260 E. Universal Way Tucson, Ariz. 85706 (520) 295-2300 Fax: (520) 295-2395 www.uasc.com	EFI-550 C3d, C4c, C5e, C6d, C52b, C105, C113	AMLCD 3.35 x 4.36 5.5-in. dia.	ARINC 6 - 429/419 1 - 561/568 2 - 453/708A 2 - RS 422 4 - analog 30 - discretes*	ARINC 429/419 (2) RS 422 (2) 6 - analog 8 - discretes	1/7.1 (EFIS-85 std.) 4.8 x 5.18 x 7.90 (from front mount surface)	$33,000* 28 VDC	*Depending on configuration.
	EFI-640 C3d, C4c, C5e, C6d, C52b, C105, C113	AMLCD 3.86 x 5.14 6.4-in. dia.	ARINC 6 - 429/419 1 - 561/568 2 - 453/708A 2 - RS 422 4 - analog 30 - discretes*	ARINC 429 (2) RS 422 (2) 6 - analog 8 - discretes	1/7.8 5 x 6 ATI 5.18 x 6.18 x 7.9 (from front mount. surface)	$34,000* 28 VDC	Horizontal viewing angles of +/-60°.; electronically adjusted vertical viewing angle; sunlight readability with greater than 10,000/1 dimming range. *Depending on configuration.
	EFI-600 C3d, C4c, C5e, C6d, C52b, C105, C113	AMLCD 4.21 x 4.21; 6.0- in. dia.	ARINC 6 - 429/419 1 - 561/568 2 - 453/708A 2 - RS 422 4 - analog 30 - discretes	ARINC 2 -429 2 - RS 422 6 - analog 8 - discretes	1/7.8 5 ATI 5.18 x 5.18 x 7.9 (from front mount surface)	$34,000* 28 VDC	Horizontal viewing angles of +/-60°.; electronically adjusted vertical viewing angle; sunlight readability with greater than 10,000/1 dimming range. *Depending on configuration.
	EFI-890R C2d, C3d, C4c, C5e, C6d, C8d, C10b, C34e, C35d, C36c, C40c, C41d, C52b, C63c, C66c, C87, C92c, C95, C105, C113, C115b, C118, C119a, C129a, C151a	active matrix color LCD 6.3 x 6.3 (8.0 in dia.)	Analog: 6 ARINC 429, 5 CSDB, 2 ARINC 708, 3 Manchester bus ports 2 VGA or 1 RDR-1E/F & 1 VGS, 1 RS 232 (maint.) Digital: 28 GND/OPN discretes, 14 28 VDC/ OPN 4 ARINC 407 with 2 ref. inputs, 15 analog DC	Analog: 2 ARINC 429, 2 CSDB, 1 Manchester bus port Digital: 5 GND/OPN discretes, 3 28 VDC/OPN discretes, 6 analog resolvers, 2 DC differential, 2 DC single ended	1/12.0 bezel: 7.84 h x 7.42 w depth: 9.79 (back of bezel to rear of connector)	$58,000* 28 VDC	Horizontal viewing angle +60°/-60°, vertical viewing angle +45°/-10°; resolution: 780 x 780 pixels; 124.5 color groups per inch (CGPI); sunlight readability with greater than 10,000/1 dimming range. *Depending on configuration.

ELECTRONIC FLIGHT BAGS

Manufacturer	Model Class	Display Display Size	Inputs	Outputs	Units/Weight (lb) Size	Price Power Required	Remarks
CMC Electronics 415 Legget Dr. Ottawa, Ontario Canada K2K-2B2 (613)592-6500 Fax: (613) 592-7427 www.cmcelectronics.ca	Pilot-View EFB Class 2	touch-screen AML CD 1024 x 768 pixel resolution 6.0 x 8.0 x 1.5 8.4-in diagonal	ARINC 429 ethernet wireless-802 11g, USB 2.0 PCMICA RS 170 RS 232 NTSC video	ARINC 429 ethernet wireless-802 11g USB 2.0 PCMICA RS 170 RS 232	2/5.5 NA	$18,842 9 - 36 VDC	Touch-sensitive screen and line select keys. Intuitive pilot interface. Applications include: electronic charts such as JeppView and JeppFlite Deck, checklists, performance calculations, electronic documents, moving maps and weather.
NavAero 9-15 W. Hubbard St. 5th Floor Chicago, Ill. 60610 (866) 628-2376 Fax: (312) 423-9966 www.navaero.com	t-BagC2 EFB Class 2	color TFT LCD resistive touch screen 8.4 in or 10.4	CPU: 1 USB slot Connectors: 61 pin sealed cradle connector, tPad interface, 3 USB, 1 RS 232 1 LAN	CPU: 1 USB slot Connectors: 61 pin sealed cradle connector, tPad interface 3 USB, 1 RS 232 1 LAN	1/NA 93.8 x 113.8 23.8 excluding connectors and mounting hardware	$3,495* with 8.4-in display $3,995* with 10.4-in display 13.8 - 30 VDC 60W maximum	*Installation kit extra. Class 2 EFB can be used to store, retrieve, display and use a wide variety of required documents and procedures such as operations specifications, performance data, operations manuals, MELs, control documents and video surveillance. CPU: 1 GHz processor, 40GB hard drive, 512MB memory, Windows XP Professional OS. Removable CPU module computer system contains CPU, power supply and emergency battery back-up nickel cadmium power pack.
Universal Avionics Systems Corp. 3260 E. Universal Way Tucson, Ariz. 85706 (520) 295-2300 Fax: (520) 295-2395 www.uasc.com	UCD (Universal Cockpit Display) Class 2	UCDT II touch screen terminal display 5.0 x 6.50 8.4-in. diagonal	4 ARINC 429, 8 discrete, 2 NTSC video 1 S video 10/100 base T network capability	1 ARINC 429 4 discrete, 10/100 base T network capability	Remote UCD computer 1/8.9 1 MCU UCD terminal II 1/2.8 6.45 x 8.43 x 1.48	$19,500 28 VDC $13,000 powered by UCD	Provides supplementary display for viewing electronic charts, checklists and external video sources. As an electronic flight bag (EFB), the UCD supports a terminal area chart database via Jeppesen, Inc. Charts, NOTAMs and airport information downloaded from CD-ROM and stored in flash memory within UCDC. Flight plan departure and arrival airport information from FMS prompts displays of departure, arrival and approach charts and airport diagrams. Manual searches accomplished via pull-down menu and touch-screen keyboard. Two user-defined zoom levels. System overlays aircraft position onto approach charts and airport diagrams.

ENHANCED VISION SYSTEMS (EVS)

Manufacturer	Model / TSO	Display / Display Size	Inputs	Outputs	Units/Weight (lb) / Size	Price / Power Required	Remarks
CMC Electronics 415 Legget Dr. Ottawa, Ontario Canada K2K-2B2 (613)592-6500 Fax: (613) 592-7427 www.cmcelectronics.ca	EVS-1000 IR EVS NA	head-down EVS 2.77	single, long-wave infrared sensor; ARINC 429 opt.	raster capable HUDs; independent cockpit LCD; video compatible FMS CDU and MFD; ARINC 429 opt. RS-170 output with RS-232 interface	sensor head: 1/2.5 2.8 x 6.8 power module: 1/2.5 3.75 x 5.0 x 2.5	$83,400* 28 VDC 30 W electronics: 10 W peak at 28 VCDC; environmental: <50 W avg.; 125 W max (with heater)	When used with a HUD as part of a certified EVS, infrared sensor provides situational awareness to pilots for night and low-visibility situations.
	EVS-2500 Dual Sensor IR EVS NA	head-up or head-down EVS	dual,long-wave infrared sensors ARINC 429 opt.	raster capable HUDs; independent cockpit LCD; video compatible FMS CDU; analog video per RS-170 ARINC 429 opt.	sensor unit: 1/10.0 11.0 x 6.88 x 6.27 processor unit: 1/5.0 1/4 ATR	$350,000* electronics: 10 W typical; 75 W peak at 28 VDC per DO-160 category Z environmental: 225 W typical; 275 W peak with window deicer	Infrared sensor provides situational awareness to pilots for night and low-visibility situations.
Kollsman 220 Daniel Webster Hwy. Merrimack, N.H. 03054 (603) 889-2500 www.kollsman.com	All Weather Window Enhanced Vision System see remarks	HUD/HDD	1 - 5 micron forward-looking infrared (FLIR) sensor; ARINC 427	RS 170 analog video; SMPTE 259; digital video-any raster capable; head-up or head-down display, like a CRT or LCD	3/21.0 1/2 ATR	(available from Gulfstream 28 VDC	STC'd on Gulfstream GIV, GV, and as an option for the G-300, G400, G500, GV, and GIVSP. Standard equipment on Gulfstream GVSP (G550) and G450 aircraft. Provides real time image of outside scene of airport runway lights and surrounding environment in aircraft's flight path. Provides lower landing minimum credit per FAR 91.175 EFVS regulations.
MAX-VIZ, Inc. 16165 SW 72nd. Ave. Portland, OR 97224 (503) 968-3036 www.Max-Viz.com	EVS-1000 IR EVS NA	head-down enhanced vision system 2.77 dia.	single long wave infrared sensor; ARINC 429 opt.	raster capable head-up displays; independent cockpit LCD displays; video compatible FMS CDU; video compatible MFD; ARINC 429 opt. RS 170 output with RS 232 interface	sensor head: 2.8-in. dia. x 6.8 long/2.5 lb Power module: 3.75 x 5.0 x 2.5/2.5 lb	$83,400* electronics: 10 W typical 25 W peak at 28 VDC; environmental: <50 W avg; 125 W max (with heater)	Tail/nose mounted infrared camera that provides a 40° field of view to a cockpit display for viewing by the cockpit crew. Installation kit and harness not included. Resolution 320 x 240 pixels. Independent cockpit LCD; video compatible FMS CDU; video vompatible MFD. Field of view (FOV) Head-down display 53° x 40° typical; special FOVs on request. **B&CA* estimate.
	EVS-2500 Dual Sensor IR EVS NA	head-up or head down enhanced vision system	dual long wave infrared sensor; ARINC 429 opt.	raster capable head-up displays; independent cockpit LCD displays; video compatible FMS CDU; analog video per RS 170; ARINC 429 opt.	sensor unit: 1/10.0 11.0 x 6.88 x 6.27 in. processor: 1/5.0 1/4 ATR	$350,000* electronics: 50 W typical; 75 W peak at 28 VDC per DO-160 category Z environmental: 225 W typical; 275 W peak with window deicer on	Dual sensor version of above. Field of view (FOV): 53° x 40° or 30° x 22.5°; others available on request. Resolution 320 x 240 pixels. Includes wiring harness and connectors. **B&CA* estimate.

FLIGHT MANAGEMENT SYSTEMS

Manufacturer	Chelton Flight Systems	Chelton Flight Systems	CMC Electronics	CMC Electronics	CMC Electronics
Model	See Remarks	See Remarks	CMA-900	CMA-3000	CMA-9000
***B&CA* Operational Category**	III	III			
CDU *(See Legend)* | **Display** *(See Legend)*	P | LCD-C	P | LCD-C	F | C, LCD	F | C, LCD*	F | C, LCD
Data Entry Format *(See Legend)*	D	D	S	S	S
RNP Certification	RNP-0.1	–	RNP-0.3, -10, BRNAV, PRNAV	RNP-0.3, -10, BRNAV, PRNAV	RNP-0.3, -10, BRNAV, PRNAV
Lateral Modes SIDs/STARs | Airways	Std. | Std.	Std. | Std.	Std. | Std.	Std. | Std.	Std. | Std.
# ARINC 424 Procedure Legs	23	23	23	23	23
Auto. FMS-to-NAV | Direct-to-Resume	Std. | Std.	– | –	– | Std.	– | Std.	– | Std.
Vertical Nav Modes *(See Legend)*	M	M	M, A*	M, A	M, A*
Performance Management | Remote Radio Tuning	Opt. | Std.	– | –	* | Std.	– | Std.	– | Std.
TSOed Nav Sensors GPS | C129 TSO	Std. | *	Std. | *	Std. | A1, B1, C1	Std. | A1	Std. | A1
(Internal or Remote) VOR | DME | INS	Std. | –| –	Std. | –| –	Std. | Std.| Std.	Std. | Std.| Std.	Std. | Std.| Std.
IRS | Loran-C | TACAN	Opt. | –| Opt.	Opt. | –| –	Std. | –| –	Std. | –| Std.	Std. | –| Std.
Available # ARINC 429 (in/out)	8/4	8/4	19/0	9/0	24/0
Specific Interfaces ARINC 429 GPS	NA	Std.	Std.	Std.	Std.
S422A CSDB DME | ARINC 429 DME	– | –	– | Std.	Opt. | Std.	– | Std.	– | Std.
BENDIX 429 VOR | ARINC 429 VOR	– | Std.	– | Std.	– | Std.	– | Std.	– | Std.
ARINC 429 INS	Std.	Std.	Std.*	Std.*	Std.*
ARINC Radar (in)	Std.	Opt.	–	–	–
Air Data (ADC in) ARINC 565 | ARINC 575	Opt. | –	Opt. | –	* | Std.	– | Std.	* | Std.
Coarse/Fine A407 Synchro	Opt.	Opt.	*	*	*
ARINC 545 TAS	–	–	Std.	*	*
ARINC 429 ADC | RS232 ADC	Std. | Std.	Std. | Std.	Std. | –	Std. | –	Std. | –
Fuel Flow (in) **(A)** ARINC **(B)** RS232 **(C)** Other	B, C	B, C	A, 4-engine	A, 2-engine	A, 4-engine
ARINC 429 (out) RS232 Display Output	Std.	Std.	–	–	–
ARINC 429 LO-xmtr *(std./opt.)*	4/4	2/2	*	*	*
ARINC 429 HI-xmtr *(std./opt.)*	4/4	2/2	5/0*	2/0*	8/0*
EFIS (out) **(A)** ARINC 429 **(B)** ARINC 561	A	A	A, B	A	A
ARINC INS format (out)	429	429	429	429	429
ARINC Long-Range Nav format (out)	429	429	429, 561, 702	429, 702	429, 702
HSI Format (out) ARINC 429 HSI	–	–	Std.	Std.	Std.
ARINC 561 Course/Bearing	–	–	Opt.	Opt.	Opt.
Course/Bearing A407 Synchro	Std.	–	Std.	–	Opt.
Analog L/R-U/D-T/F DC	Std. (no T/F)	Std. (no T/F)	Std.	–	Opt.
A/P Steering Format (out) ARINC 429R/S | 429P/S	Std. | Std.	Std. | Std.	Std. | Opt.	Std. | –	Std. | Opt.
Analog Roll Steering | Analog Pitch Steering	Opt. | Opt.	– | –	Std. | Opt.	– | –	Std. | Opt.
ARINC Dist. Format (out)	429	–	429, 561, 568	429, 561, 568	429, 561, 568
AFIS/ARINC Format (in/out)	–	–	429/429	–/–	429/429
Database/Route Storage # User Defined WPTs	500	500	–	500	500
# Flight Plans | # WPTs per Flight Plan	100 | 99	100 | 40	400 | 99	400 | 99	400 | 99
(D) Data Card, **(C)** Cartridge, **(R)** Disc Reader	D	D	R	R	R
Com. Freq's | Special Use Airspace alerts	Std. | Std.	Std. | Std.	– | –	Std. | –	Std. | –
Navaid Frequencies **(E)** En Route **(A)** Approach	E, A	E, A	E, A	E, A	E, A
Weight, Dimensions & Power Weight (lb)	4.5	4.5	6.0	6.5	8.0
CDU Height x Width x Length (in.)	5.5 x 6.75 x 4.5	5.5 x 6.75 x 4.5	6.75 x 5.75 x 6.5	6.75 x 5.75 x 6.5	6.75 x 5.75 x 7.15
Power	B	B	B	B	B
Remote Computer size (MCU) | Weight (lb)	– | –	– | –	2 | 8	– | –	– | –
Power (std./opt.) (volts AC &/or DC)	A, B/DC	B/DC	B	B	B
Price	$70,000**	$75,750	$80,000	$45,000	TBD
Remarks	Shadin ADC 2000, Chelton Quickstart. (See also Chelton Synthetic Vision EFIS in MFD category.) *WAAS 145A/146 standard. **Two screens, $95,200.	Shadin ADC 2000, Chelton Quickstart. (See also Chelton Synthetic Vision EFIS in MFD category.) *WAAS 145A/146 standard.	*Advisory VNAV for climb, cruise, descent, approach. Performance table based. Built-in GPS receiver. All ARINC 429 I/O configurable for speed/function. Triple-mix INS/IRS mode.	*NVG display. Radio management (99 comm frequencies). All ARINC 429 I/O configurable for speed/function. Dual INS/IRS inputs. Converter units available. Many special helicopter features.	NVG display. *Advisory VNAV for climb, cruise, descent, approach. Performance table based. All ARINC 429 I/O configurable for speed/function. Converter units available. VNAV approaches. Enhanced version available.

CONTROL DISPLAY UNIT
P = Panel Mount CDU
F = Full Apha Keyboard
A = Alpha Keyboard
D = Other Dzus CDU

DISPLAY
C = Color **M** = Monochrome
P = Penetration Phosphor Color
LCD = Liquid Crystal Display
LED = Light Emitting Diode

DATA ENTRY FORMAT
D = Direct
S = Scratchpad

VERTICAL NAV MODES
M = Multi Waypoint
A = Advisory
S = Single Waypoint

POWER
A = 10-19 VDC
B = 20-40 VDC
C = 115 VAC

FLIGHT MANAGEMENT SYSTEMS

Manufacturer	FreeFlight Systems, Ltd.	FreeFlight Systems, Ltd.	Garmin International	Garmin International	Garmin International
Model	**2101 Approach Plus**	**2101 I/O Approach Plus**	**GPS 155 XL TSO**	**GNC 300 XL TSO**	**GPS 165 TSO**
***B&CA* Operational Category**	I	I	I	I	I
CDU *(See Legend)* | **Display** *(See Legend)*	D | LED	D | LED	P | LCD	P | LCD	Rmks. | Rmks.
Data Entry Format *(See Legend)*	D	D	D	D	D
RNP Certification	BRNAV	BRNAV	BRNAV	BRNAV	BRNAV
Lateral Modes SIDs/STARs | Airways	Std. | –	Std. | –	Std. | –	Std. | –	Std. | –
# ARINC 424 Procedure Legs	4	4	–	–	–
Auto. FMS-to-NAV | Direct-to-Resume	– | –	– | –	– | –	– | –	– | –
Vertical Nav Modes *(See Legend)*	A	A	A	A	A
Performance Management | **Remote Radio Tuning**	– | –	– | –	– | –	– | –	– | –
TSOed Nav Sensors GPS | C129 TSO	Std. | A1	Std. | A1	– | –	Std. | A1	Std. | A1
(Internal or Remote) VOR | DME | INS	– | – | –	– | – | –	– | – | –	– | – | –	– | – | –
IRS | Loran-C | TACAN	– | – | –	– | – | –	– | – | –	– | – | –	– | – | –
Available # ARINC 429 (in/out)	4/0	4/0	1	1	2/0
Specific Interfaces ARINC 429 GPS	–	Std.	Std.	Std.	Std.
S422A CSDB DME | ARINC 429 DME	– | –	– | –	– | –	– | –	– | –
BENDIX 429 VOR | ARINC 429 VOR	– | –	– | –	– | –	– | –	– | –
ARINC 429 INS	–	–	–	–	–
ARINC Radar (in)	–	–	–	–	–
Air Data (ADC in) ARINC 565 | ARINC 575	– | –	Std. | Std.	– | –	– | –	– | –
Coarse/Fine A407 Synchro	–	Std.	–	–	–
ARINC 545 TAS	–	Std.	–	–	–
ARINC 429 ADC | RS232 ADC	– | Std.	Std. | Std.	– | Std.	– | Std.	– | Std.
Fuel Flow (in) **(A)** ARINC **(B)** RS232 **(C)** Other	B	B	B	B	B
ARINC 429 (out) RS232 Display Output	Std.	Std.	Std.	Std.	Std.
ARINC 429 LO-xmtr *(std./opt.)*	–/–	2/0	1/0	1/0	1/0
ARINC 429 HI-xmtr *(std./opt.)*	–/–	2/0	1/0	1/0	1/0
EFIS (out) **(A)** ARINC 429 **(B)** ARINC 561	–/–	A/B	Std./Opt.	Std./Opt.	Std./Opt.
ARINC INS format (out)	–	–	–	–	–
ARINC Long-Range Nav format (out)	–	429	429	429	429
HSI Format (out) ARINC 429 HSI	–	Std.	Std.	Std.	Std.
ARINC 561 Course/Bearing	–	Std.	Opt.	Opt.	Opt.
Course/Bearing A407 Synchro	–	Std.	Opt.	Opt.	Opt.
Analog L/R-U/D-T/F DC	–	Std.	Std.	Std.	Std.
A/P Steering Format (out) ARINC 429R/S | 429P/S	– | –	Std. | –	– | Std.	Std. | –	Std. | –
Analog Roll Steering | Analog Pitch Steering	– | –	Opt. | –	Opt. | –	Opt. | –	Opt. | –
ARINC Dist. Format (out)	–	A	429	429	429
AFIS/ARINC Format (in/out)	–	RS422	–	–	–
Database/Route Storage # User Defined WPTs	250	250	1,000	1,000	1,000
# Flight Plans | # WPTs per Flight Plan	40 | 40	40 | 40	20 | 31	20 | 31	20 | 31
(D) Data Card, **(C)** Cartridge, **(R)** Disc Reader	D	D	D	D	D
Com. Freq's | Special Use Airspace alerts	– | –	Std. | Std.	Std. | Std.	Std. | Std.	-- | Std.
Navaid Frequencies **(E)** En Route **(A)** Approach	E	E	E, A	E, A	E, A
Weight, Dimensions & Powe Weight (lb)	3.65	3.65	2.4	2.4	2.0
CDU Height x Width x Length (in.)	3.0 x 5.75 x 7.68	3.0 x 5.75 x 7.68	2.0 x 6.25 x 5.8	2.0 x 6.25 x 5.8	2.25 x 5.75 x 5.65
Power	A | B	A | B	A | B	A | B	A | B
Remote Computer size (MCU) | Weight (lb)	– | –	– | –	– | –	– | –	– | –
Power (std./opt.) (volts AC &/or DC)	–	–	–	–	–
Price	$7,245	$11,500	$3,995	$4,795	$6,495
Remarks	Price includes receiver, datacard, installation kit (with antenna), installation manual and pilot guide. Unit also available with night vision goggle compatibility.	Price includes receiver, datacard, installation kit (with antenna), installation manual and pilot guide. Sole means oceanic approval; interfaces with EGPWS.	Twelve-channel parallel GPS receiver with moving map display.	Twelve-channel parallel GPS receiver with moving map display. Five-watt comm transmitter.	Display: vacuum fluorescent; comes with a MultiTrac8 GPS receiver.

CONTROL DISPLAY UNIT
P = Panel Mount CDU
F = Full Apha Keyboard
A = Alpha Keyboard
D = Other Dzus CDU

DISPLAY
C = Color **M** = Monochrome
P = Penetration Phosphor Color
LCD = Liquid Crystal Display
LED = Light Emitting Diode

DATA ENTRY FORMAT
D = Direct
S = Scratchpad

VERTICAL NAV MODES
M = Multi Waypoint
A = Advisory
S = Single Waypoint

POWER
A = 10-19 VDC
B = 20-40 VDC
C = 115 VAC

FLIGHT MANAGEMENT SYSTEMS

Manufacturer	Garmin International	Garmin International	Garmin International	Garmin International	Garmin International
Model	**GPS 400**	**GNC 420/420A***	**GNS 430/430A***	**GPS 500**	**GNS 530/530A***
***B&CA* Operational Category**	I	I	I	I	I
CDU *(See Legend)* | **Display** *(See Legend)*	P | C	P | C	P | C	P | C	P | C
Data Entry Format *(See Legend)*	D	D	D	D	D
RNP Certification	RNP-10, BRNAV	RNP-10, BRNAV	RNP-10, BRNAV	RNP-10, BRNAV	RNP-10, BRNAV
Lateral Modes SIDs/STARs | Airways	Std. | –	Std. | –	Std. | –	Std. | –	Std. | –
# ARINC 424 Procedure Legs	19	19	19	19	19
Auto. FMS-to-NAV | Direct-to-Resume	– | –	– | –	Std. | –	– | –	Std. | –
Vertical Nav Modes *(See Legend)*	A	A	A	A	A
Performance Management | **Remote Radio Tuning**	– | –	– | –	– | –	– | –	– | –
TSOed Nav Sensors GPS | C129 TSO	Std. | A1	Std. | A1	Std. | A1	Std. | A1	Std. | A1
(Internal or Remote) VOR | DME | INS	– | – | –	– | – | –	Std. | – | –	– | –	Std. | – |–
IRS | Loran-C | TACAN	– | – | –	– | – | –	– | – | –	– | –	– | – |–
Available # ARINC 429 (in/out)	2/0	2/0	2/0	2/0	2/0
Specific Interfaces ARINC 429 GPS	Std.	Std.	Std.	Std.	Std.
S422A CSDB DME | ARINC 429 DME	– | –	– | –	– | –	– | –	– | –
BENDIX 429 VOR | ARINC 429 VOR	– | –	– | –	– | Std.	– | –	– | Std.
ARINC 429 INS	–	–	–	–	–
ARINC Radar (in)	–	–	–	–	–
Air Data (ADC in) ARINC 565 | ARINC 575	Opt. | Opt.	Opt. | Opt.	Opt. | Opt.	Opt. | Opt.	Opt. | Opt.
Coarse/Fine A407 Synchro	Opt.	Opt.	Opt.	Opt.	Opt.
ARINC 545 TAS	Opt.	Opt.	Opt.	Opt.	Opt.
ARINC 429 ADC | RS232 ADC	Std. | Std.	Std. | Std.	Std. | Std.	Std. | Std.	Std. | Std.
Fuel Flow (in) **(A)** ARINC **(B)** RS232 **(C)** Other	A, B	A, B	A, B	A, B	A, B
ARINC 429 (out) RS232 Display Output	Std.	Std.	Std.	Std.	Std.
ARINC 429 LO-xmtr *(std./opt.)*	2/0	2/0	2/0	2/0	2/0
ARINC 429 HI-xmtr *(std./opt.)*	2/0	2/0	2/0	2/0	2/0
EFIS (out) **(A)** ARINC 429 **(B)** ARINC 561	Std./Opt.	Std./Opt.	Std./Opt.	Std./Opt.	Std./Opt.
ARINC INS format (out)	–	–	–	–	–
ARINC Long-Range Nav format (out)	429	429	429	429	429
HSI Format (out) ARINC 429 HSI	Std.	Std.	Std.	Std.	Std.
ARINC 561 Course/Bearing	Opt.	Opt.	Opt.	Opt.	Opt.
Course/Bearing A407 Synchro	Opt.	Opt.	Opt.	Opt.	Opt.
Analog L/R-U/D-T/F DC	Std.	Std.	Std.	Std.	Std.
A/P Steering Format (out) ARINC 429R/S | 429P/S	Std. | –	Opt. | –	Std. | –	Std. | –	Std. | –
Analog Roll Steering | Analog Pitch Steering	Opt. | –	Std. | –	Opt. | –	Opt. | –	Opt. | –
ARINC Dist. Format (out)	429	429	429	429	429
AFIS/ARINC Format (in/out)	–	–	–	–	–
Database/Route Storage # User Defined WPTs	1,000	1,000	1,000	1,000	1,000
# Flight Plans | # WPTs per Flight Plan	20 | 31	20 | 31	20 | 31	20 | 31	20 | 31
(D) Data Card, **(C)** Cartridge, **(R)** Disc Reader	D	D	D	D	D
Com. Freq's | Special Use Airspace alerts	Std. | Std.	Std. | Std.	Std. | Std.	Std. | Std.	Std. | Std.
Navaid Frequencies **(E)** En Route **(A)** Approach	E, A	E, A	E, A	E, A	E, A
Weight, Dimensions & Power Weight (lb)	4.9	5.8	6.6	6.9	8.4
CDU Height x Width x Length (in.)	2.65 x 6.25 x 11.0	2.65 x 6.25 x 11.0	2.65 x 6.25 x 11.0	4.6 x 6.25 x 11.0	4.6 x 6.25 x 11.0
Power	A | B	A, B	A, B	A, B	A, B
Remote Computer size (MCU) | Weight (lb)	– | –	– | –	– | –	– | –	– | –
Power (std./opt.) (volts AC &/or DC)	–	–	–	–	–
Price	$6,795	$7,995*	$9,250*	$12,500	$14,995*
Remarks	Twelve-channel GPS with color moving map. FDE primary means remote and oceanic.	Twelve-channel GPS with color moving map and 8.33-kHz VHF comm. FDE primary means remote and oceanic. *GNC 420A, $12,995; incl. 16-watt min. comm TX. Terrain advisories/TAWS-B.	Comes with a GPS and VOR/ILS receiver and 8.33-kHz VHF comm. FDE primary means remote and oceanic. Terrain advisories/TAWS-B. *GNS 430A, $14,250; incl. 16-watt min. comm TX.	Twelve-channel GPS with color moving map. New model from this OEM. FDE primary means remote and oceanic. Terrain advisories/TAWS-B.	Comes with a GPS and VOR/ILS receiver and 8.33-kHz VHF comm. FDE primary means remote and oceanic. Terrain advisories/TAWS-B. *GNS 530A, $19,995; incl. 16-watt min. comm TX.

CONTROL DISPLAY UNIT
P = Panel Mount CDU
F = Full Apha Keyboard
A = Alpha Keyboard
D = Other Dzus CDU

DISPLAY
C = Color **M** = Monochrome
P = Penetration Phosphor Color
LCD = Liquid Crystal Display
LED = Light Emitting Diode

DATA ENTRY FORMAT
D = Direct
S = Scratchpad

VERTICAL NAV MODES
M = Multi Waypoint
A = Advisory
S = Single Waypoint

POWER
A = 10-19 VDC
B = 20-40 VDC
C = 115 VAC

FLIGHT MANAGEMENT SYSTEMS

Manufacturer	Honeywell Aero. Electronic Systems	Honeywell Aero. Electronic Systems	Honeywell Aero. Electronic Systems	Rockwell Collins	Rockwell Collins
Model	**KLN 900**	**GNS-XLs**	**FMZ-2000**	**FMS 3000/5000**	**FMS 4200/6000**
***B&CA* Operational Category**	I	III	III	III	III
CDU *(See Legend)* | **Display** *(See Legend)*	D | M	F | LCD	F | LCD, C	F | C/LCD	F | C/CRT
Data Entry Format *(See Legend)*	D	D	Std.	Std.	Std.
RNP Certification	RNP-10	RNP-0.3, -10.5, BRNAV	RNP-0.3	RNP-0.3, -10, BRNAV	RNP-0.3, -10, BRNAV
Lateral Modes SIDs/STARs | Airways	Std. | –	Std. | Std.	Std. | Std.	Std. | Std.	Std. | Std.
# ARINC 424 Procedure Legs	–	10	23	23	23
Auto. FMS-to-NAV | Direct-to-Resume	– | Std.	– | Std.	Std. | Std.	Std. | –	Std. | –
Vertical Nav Modes *(See Legend)*	A	A	M, A	M	M
Performance Management | **Remote Radio Tuning**	– | –	– | Std.	Rmks. | Std.	Std. | Std.	Std. | Std.
TSOed Nav Sensors GPS | C129 TSO	Std. | A1	Std. | A1, B1, C1	Std. | B1, C1	Std. | B1, C1	Std. | B1, C1
(Internal or Remote) VOR | DME | INS	– | – | –	Opt. | Opt. | Opt.	Std. | Std. | Std.	– | Std. | Std.	– | Std. | Std.
IRS | Loran-C | TACAN	– | – | –	Opt. | – | –	Std. | – | Opt.	– | Std. | –	– | Std. | –
Available # ARINC 429 (in/out)	3/0	13/0	21/0	4/3	4/3
Specific Interfaces ARINC 429 GPS	–	Std.	Std.	*	*
S422A CSDB DME | ARINC 429 DME	– | –	Std. | Std.	Std. | Std.	* | *	* | *
BENDIX 429 VOR | ARINC 429 VOR	– | –	Std. | Std.	– | Std.	* | *	* | *
ARINC 429 INS	–	Std.	Std.	*	*
ARINC Radar (in)	–	Std.	Std.	*	*
Air Data (ADC in) ARINC 565 | ARINC 575	Std. | –	Std. | Std.	– | –	* | *	* | *
Coarse/Fine A407 Synchro	–	Std.	–	*	*
ARINC 545 TAS	–	Std.	–	*	*
ARINC 429 ADC | RS232 ADC	Std. | Std.	Std. | –	Std. | –	* | *	* | *
Fuel Flow (in) **(A)** ARINC **(B)** RS232 **(C)** Other	B, C	C	A, C	*	*
ARINC 429 (out) RS232 Display Output	Std.	–	6/0	–	–
ARINC 429 LO-xmtr *(std./opt.)*	1/0	7/0	*	0/0	0/0
ARINC 429 HI-xmtr *(std./opt.)*	0/1	7/0	*	0/0	0/0
EFIS (out) **(A)** ARINC 429 **(B)** ARINC 561	A, B	A, B	A, B	A	A
ARINC INS format (out)	–	429, 571	–	*	*
ARINC Long-Range Nav format (out)	429, 561	429	429	*	*
HSI Format (out) ARINC 429 HSI	Std.	Std.	Std.	*	*
ARINC 561 Course/Bearing	Std.	Std.	Std.	*	*
Course/Bearing A407 Synchro	Opt.	Std.	Std.	–	–
Analog L/R-U/D-T/F DC	Std.	Std.	Std.	–	–
A/P Steering Format (out) ARINC 429R/S | 429P/S	Std. | –	Std. | –	Std. | –	Std. | Std.	Std. | Std.
Analog Roll Steering | Analog Pitch Steering	Std. | –	Std. | –	– | –	– | –	– | –
ARINC Dist. Format (out)	429, 561, 568	429, 561, 571	429, ASCB	–	–
AFIS/ARINC Format (in/out)	–	RS-422	429	–	–
Database/Route Storage # User Defined WPTs	1,000	999	1,000	100	100
# Flight Plans | # WPTs per Flight Plan	25 | 30	56 | 50	3,000 | 100	1,000 | 100	1,000 | 100
(D) Data Card, **(C)** Cartridge, **(R)** Disc Reader	D	D	R	R	R
Com. Freq's | Special Use Airspace alerts	Std. | Std.	– | –	– | –	– | –	– | –
Navaid Frequencies **(E)** En Route **(A)** Approach	E	E	E, A	E, A	E, A
Weight, Dimensions & Powe Weight (lb)	4.5	7	7	8.9	4
CDU Height x Width x Length (in.)	3.75 x 5.75 x 9.46	4.5 x 5.75 x 7.62	7.13 x 5.75 x 6.75	6.375 x 5.75 x 6.33	6.375 x 5.75 x 6.33
Power	B	B	B/B	B	B
Remote Computer size (MCU) | Weight (lb)	– | –	– | –	2 | 7.9	Rmks. | 1.9	Rmks. | 1.9
Power (std./opt.) (volts AC &/or DC)	–	–	B/-	–	–
Price	$17,490	$42,410	$145,420	NA	NA
Remarks	Add $1,000 for KA90 HSI adapter. BRNAV and primary means oceanic version available. RAIM and FDE prediction. Database update via Internet available.	Enhanced version available. Optional RPU will display wx and EGPWS graphics.	Performance management uses Honeywell SmartPerf as standard; Gulfstream IV/IV-SP uses table-based performance. *HI/LO configurable.	*FMS I/O provided via 4 redundant concentrators. Remote computer dimensions 1.7 x 8.74 x 6.06 in.; FMS 5000 requires radio tuning unit. FMS 3000 radio tuning is internal.	*FMS I/O provided via 4 redundant concentrators. See FMS 3000 remarks. FMS 4200 has advisory VNAV but not FMS to ILS auto transfer. Coupled VNAV available on FMS 6000.

CONTROL DISPLAY UNIT
P = Panel Mount CDU
F = Full Apha Keyboard
A = Alpha Keyboard
D = Other Dzus CDU

DISPLAY
C = Color **M** = Monochrome
P = Penetration Phosphor Color
LCD = Liquid Crystal Display
LED = Light Emitting Diode

DATA ENTRY FORMAT
D = Direct
S = Scratchpad

VERTICAL NAV MODES
M = Multi Waypoint
A = Advisory
S = Single Waypoint

POWER
A = 10-19 VDC
B = 20-40 VDC
C = 115 VAC

FLIGHT MANAGEMENT SYSTEMS

Manufacturer	Rockwell Collins	Universal Avionics Systems	Universal Avionics Systems	Universal Avionics Systems
Model	**FMS 6100**	**UNS-1L**	**UNS-1E**	**UNS-1F**
***B&CA* Operational Category**	III	III	III	III
CDU *(See Legend)* | **Display** *(See Legend)*	F | C/LCD	F | LCD-C	F | LCD-C	F | LCD-C
Data Entry Format *(See Legend)*	Std.	D	D	D
RNP Certification	RNP-0.3, -10, BRNAV	RNP-0.3, -5, -10	RNP-0.3, -5, -10	RNP-0.3, -5, -10
Lateral Modes SIDs/STARs | Airways	Std. | Std.	Std. | Std.	Std. | Std.	Std. | Std.
# ARINC 424 Procedure Legs	23	23	23	23
Auto. FMS-to-NAV | Direct-to-Resume	Std. | –	Std. | Std.	Std. | Std.	Std. | Std.
Vertical Nav Modes *(See Legend)*	M	M	M	M
Performance Management | **Remote Radio Tuning**	Std. | Std.	Opt. | Opt.	Opt. | Opt.	Opt. | Opt.
TSOed Nav Sensors GPS | C129 TSO	Std. | B1, C1	Std. | A1, B1, C1	Std. | A1, B1, C1.	Std. | A1, B1, C1
(Internal or Remote) VOR | DME | INS	Std. | Std. | –	Opt. | Opt. | Opt.	Opt. | Opt. | Opt.	Opt. | Opt. | Opt.
IRS | Loran-C | TACAN	– | Std. | –	Opt. | Opt. | Opt.	Opt. | Opt. | Opt.	Opt. | Opt. | Opt.
Available # ARINC 429 (in/out)	4/3	6/8	8/16	8/16
Specific Interfaces ARINC 429 GPS	*	Std.	Std.	Std.
S422A CSDB DME | ARINC 429 DME	* | *	Std. | Std.	Std. | Std.	Std. | Std.
BENDIX 429 VOR | ARINC 429 VOR	* | *	Std. | Std.	Std. | Std.	Std. | Std.
ARINC 429 INS	*	Std.	Std.	Std.
ARINC Radar (in)	*	Std.	Std.	Std.
Air Data (ADC in) ARINC 565 | ARINC 575	* | *	Opt. | Std.	Rmks. | Std.	Opt. | Std.
Coarse/Fine A407 Synchro	*	Opt.	Rmks.	Opt.
ARINC 545 TAS	*	Opt.	Rmks.	Opt.
ARINC 429 ADC | RS232 ADC	* | *	Std. | –	Std. | –	Std. | –
Fuel Flow (in) **(A)** ARINC **(B)** RS232 **(C)** Other	*	A,C	A,C	A, C
ARINC 429 (out) RS232 Display Output	–	–	–	–
ARINC 429 LO-xmtr *(std./opt.)*	0/0	2/0	2/4	2/4
ARINC 429 HI-xmtr *(std./opt.)*	0/0	1/2	2/4	2/4
EFIS (out) **(A)** ARINC 429 **(B)** ARINC 561	A	A, B	A, B	A, B
ARINC INS format (out)	*	429, 571	429, 571	429, 571
ARINC Long-Range Nav format (out)	*	429, 561, 571	429, 561, 571	429, 561, 571
HSI Format (out) ARINC 429 HSI	*	Std.	Std.	Std.
ARINC 561 Course/Bearing	*	Std.	Std.	Std.
Course/Bearing A407 Synchro	–	Std.	Std.	Std.
Analog L/R-U/D-T/F DC	–	Std.	Std.	Std.
A/P Steering Format (out) ARINC 429R/S | 429P/S	Std. | Std.	Std. | Std.	Std. | Std.	Std. | Std.
Analog Roll Steering | Analog Pitch Steering	– | –	Std. | Std.	Std. | Std.	Std. | Std.
ARINC Dist. Format (out)	–	429, 561, 571	429, 561, 571	429, 561, 571
AFIS/ARINC Format (in/out)	–	429	429	429
Database/Route Storage # User Defined WPTs	100	200	200	200
# Flight Plans | # WPTs per Flight Plan	1,000 | 100	Rmks. | 98	Rmks. | 98	Rmks. | 98
(D) Data Card, **(C)** Cartridge, **(R)** Disc Reader	R	R	R	R
Com. Freq's | Special Use Airspace alerts	– | –	– | –	– | –	– | –
Navaid Frequencies **(E)** En Route **(A)** Approach	E, A	E, A	E, A	E, A
Weight, Dimensions & Power Weight (lb)	4	2.9	7.72	4.1
CDU Height x Width x Length (in.)	6.375 x 5.75 x 6.33	4.5 x 5.75 x 3.25	6.38 x 5.75 x 8.98	6.38 x 5.75 x 3.25
Power	B	B	B	B
Remote Computer size (MCU) | Weight (lb)	Rmks. | 1.9	2 | 6.5	–	2 | 7.6
Power (std./opt.) (volts AC &/or DC)	–	B/DC	B/DC	B/DC
Price	NA	$45,500	$58,000	$70,000
Remarks	*FMS I/O from the FMS via 4 redundant concentrators. See FMS 3000 remarks for remote computer.	Air data converter unit available; 3-D coupled approach mode; PC program for remote/oceanic ops; UniLink text compatible.	200 pilot routes, 2,000 company routes, air data converter available; 3-D approach; UniLink compatible; displays video and graphics.	200 routes, 2,000 company routes, air data converter available; 3-D approach; UniLink compatible; displays video and graphics.

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POWER
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B = 20-40 VDC
C = 115 VAC

MULTI-FUNCTION DISPLAYS

Manufacturer Model	Avidyne FlightMax EX500	Avidyne FlightMax EX5000	Chelton FlightLogic Synthetic Vision EFIS	Garmin International MX20 Series	Honeywell MFRD/80-5204
MFD Features					
Dimensions (H x W x D in inches)	4.35 x 6.25 x 10.75	8.50 x 10.70 x 3.80	6.25 x 5.5 x 4.5	5.0 x 6.25 x 8.0	6.242 x 4.815 x 8.378
Resolution (i.e., pixels)	616 x 350	800 x 600	640 x 480 (256 colors)	640 x 480	1024 x 768
Boot-Up Time (Seconds)	52	52	2.30	20	10
FAR Part 23 | FAR Part 25	Yes | No	Yes | No	Yes | Pending	Y | Y	Yes | Yes
Do 178 Software Integrity Level	D	D	C, A	C, D	B
TSO C113 MFD	Yes	Yes	Yes	Yes	Yes
TSO C63c Wx Radar	Yes	No	Pending	Yes	Yes
TSO C110a Lightning	Yes	Yes	Yes	Yes	Yes
Interfaces					
ARINC 407 Synchro I/F	Yes	No	No	No	No
ARINC 429 GAMA I/F	Yes	Yes	Generic	No	Yes
ARINC 429 Generic I/F	Yes	Yes	Yes	Yes*	Yes
ARINC TCAS I/F	Yes	No	Yes	Yes	No
ARINC 561/568 INS	No	No	No	No	No
ARINC 708/453 Wx Radar I/F	Yes	No	Pending	Yes	Yes
ARINC 735 TCAS I/F	Yes	No	Yes	No	Yes
Video | RS 232	No | Yes	Opt. | Yes	Yes | Yes	No | Yes	No | Yes
Honeywell KCPB | Honeywell WXPB	Yes | No	Yes | No	No | No	No | No	Yes | Yes
Situational Awareness Functions					
Position Awareness					
F/P Waypoints/Legs	Yes	Yes	40/40	Yes	Yes
Proximate Navaids	Yes	Yes	Yes	Yes	Yes
Proximate Airports	Yes	Yes	Yes	Yes	Yes
Proximate Intersections	Yes	Yes	Yes	Yes	Yes
Special-Use Airspace	Yes	Yes	Yes	Yes	No
Weather Awareness					
Wx: Onboard Radar	Yes	No	Pending	Yes	Yes
Wx: Onboard Lightning Sensor	Yes	Yes	Yes	Yes	Yes
Wx: Air/Ground FIS-B Downloads	No	No	Pending	Yes	No
Wx: Air/Ground Other Downloads	Yes	Yes	No	Yes	No
Wx: Satcom Data Link | Low-Rate | High-Rate	Yes | Yes	Yes | Yes	Pending | No	NA | NA	No | No
Traffic Awareness					
TIS-B via Mode S Data Link	Yes	Yes	Yes	Yes	No
TAS: TSO C147	Yes	Yes	Yes	Yes	No
TCAS I: TSO C118 | TCAS II: TSO C119	Yes | No	Yes | No	Yes | Yes	Yes | No	Yes | Yes
Terrain Awareness					
Basic Topography | Basic Cartography	Yes | Yes	Yes | Yes	Yes | Yes	Yes | Yes	Yes | Yes
TAWS: TSO C151 Class B | TAWS: TSO C151 Class A	Opt. | No	Opt. | No	Yes | Yes	Yes | Yes	No | No
Price	$11,995	$12,995	$70,000*	See Remarks	$42,500
Remarks	Price includes digital radar interface and integrated data link transceiver. Non-radar version, $9,995. Available options: Cmax, TCAS-1 and EGPWS.	Includes integrated data link. Available options: Cmax, TCAS-1 and EGPWS.	HUD symbology; 3-D modeling; Class A,B,C Taws w/threat diff.; integral GPS/WAAS; Jeppesen NavData; on-screen full-function FMS; inertial AHRS; unusual attitude recovery mode. *One screen.	*Via converter. $6,995 to $14,995 depending on options. TSO'd and/or JTSO'd for C110a, C113, C118, C63c, C147.	Combines weather radar, traffic, terrain, navigation maps and other data into a single display unit.

MULTI-FUNCTION DISPLAYS

Manufacturer Model	L-3 Avionics Systems i-linc	L-3 Avionics Systems PVI Series 600	Rockwell Collins FDS-2000	Sandel ST3400 TAWS	Universal Avionics MFD-640
MFD Features					
Dimensions (H x W x D in inches)	5.0 x 6.25 x 8.0	5.7 x 6.65 x 10.43	5.09 x 5.09 x 9.06	3.285 x 3.285 x 10.3	5.18 x 6.68 x 7.1*
Resolution (i.e., pixels)	640 680	120 pixels/line	719 x 719	1 mega-pixel	640 x 480
Boot-Up Time (Seconds)	20	10	9	15	15
FAR Part 23 | FAR Part 25	Yes | No	Yes | Yes	No | Yes	Yes | Yes	Yes | Yes
Do 178 Software Integrity Level	C, D	B	A	C	C
TSO C113 MFD	Yes	Yes	Yes	Yes	Yes
TSO C63c Wx Radar	Yes	Yes	Yes	No	Yes
TSO C110a Lightning	Yes	No	No	No	Yes
Interfaces					
ARINC 407 Synchro I/F	No	No	Yes	Yes	Yes
ARINC 429 GAMA I/F	No	Yes	Yes	Yes	Yes
ARINC 429 Generic I/F	Yes	Yes	Yes	Yes	Yes
ARINC TCAS I/F	Yes	Yes	Yes	Opt.	Yes
ARINC 561/568 INS	No	No	Yes	No	No**
ARINC 708/453 Wx Radar I/F	Yes	Yes	Yes	No	Yes
ARINC 735 TCAS I/F	Yes	Yes	Yes	Opt.	Yes
Video | RS 232	No | Yes	Yes | Yes	No | No	No | Yes	Yes | No
Honeywell KCPB | Honeywell WXPB	No | No	No | No	No | No	No | No	Yes | Yes
Situational Awareness Functions					
Position Awareness					
F/P Waypoints/Legs	Yes	No	Yes	Yes	Yes
Proximate Navaids	Yes	No	Yes	No	Yes
Proximate Airports	Yes	No	Yes	Yes	Yes
Proximate Intersections	Yes	No	Yes	No	No
Special-Use Airspace	Yes	No	No	No	No
Weather Awareness					
Wx: Onboard Radar	Yes	Yes	Yes	No	Yes
Wx: Onboard Lightning Sensor	Yes	No	No	No	Yes
Wx: Air/Ground FIS-B Downloads	No	No	No	No	No
Wx: Air/Ground Other Downloads	Yes	No	No	No	Yes
Wx: Satcom Data Link | Low-Rate | High-Rate	Yes | Yes	No | Yes	No | No	No | No	NA | NA
Traffic Awareness					
TIS-B via Mode S Data Link	No	No	No	No	No
TAS: TSO C147	Yes	No	No	Opt.	No
TCAS I: TSO C118 | TCAS II: TSO C119	Yes | No	No | No	No | Yes	Opt. | No	Yes | Yes
Terrain Awareness					
Basic Topography | Basic Cartography	Yes | Yes	No | No	No | No	Yes | No	NA | NA
TAWS: TSO C151 Class B | TAWS: TSO C151 Class A	Yes | No	No | No	No | Yes	Yes | Yes	Yes | Yes
Price	$9,071*	See Remarks	$43,427	See Remarks	$39,500
Remarks	Radar compatible version, $15,422. *B&CA estimate.	$29,900 plus $4,500 (*B&CA* estimate) for analog weather radar support TSOed to C105.	Functional replacement for conventional flight director indicator. Supports operations in CNS/ATM environment. Adapts to multiple display configurations.	TAWS Class A, $34,500; TAWS Class B, $20,950; optional raffic interface, $2,500.	*6.4-inch display; C105 and C119b interfaces; compatible with legacy radar systems, supports Universal TAWS with 3-D video display. **Displays ARINC 419 INS from LTD-92.